

AND UNUSUAL WEATHER PHENOMENA WITH LATE REPORTS AND CORRECTIONS



COVER:

East Fork White River flooding on State Route 57, one-quarter mile north of bridge at Petersburg, Indiana, looking east. The trees were damaged by the June 2, 1990 tornado. (Photo credit: Dave Sherrieb, WSFO, Indianapolis)

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STORM DATA

(ISSN 0039-1972)

National Climatic Data Center Editor: Roger W. Tanner Associate Editor: Vince Miller

Publication Staff: Lanny Dimmick, Jay Hollifield, William Angel, Mary Ann Byrd, and Sara Lackey

STORM DATA is prepared, funded, and distributed by the National Oceanic and Atmospheric Administration (NOAA). The Outstanding Storms of the Month section is prepared in cooperation with Mr. Vince Miller, Associate Editor. He is a broadcast meteorologist for THE WEATHER CHANNEL® in Atlanta, Georgia.

The Storm Data and Unusual Weather Phenomena narratives and Hurricane/Tropical Storm summaries are prepared by the National Weather Service. Monthly and annual statistics and summaries of tornado and lightning events resulting in deaths, injuries, and damage are compiled by cooperative efforts between the National Climatic Data Center and the National Severe Storms Forecast Center.

STORM DATA contains all confirmed information on storms available to our staff at the time of publication. However, due to difficulties inherent in the collection of this type of data, it is not all-inclusive. Late reports and corrections are printed in each edition.

Maps of the National Weather Service Forecast Zones which are used in the Storm Data and Unusual Weather Phenomena section will be printed in all editions.

Except for limited editing to correct grammatical errors, materials submitted are generally published as received.

Subscription, pricing, and ordering information is available from:

National Climatic Data Center Federal Building Asheville, NC 28801-2696 (704) 259-0682 or (704) CLIMATE

The editors of STORM DATA solicit your help in acquiring photographs (prints or slides; black and white, or color), maps, clippings, etc. of significant or unusual weather events (past or present). These could be for use in the "Outstanding Storms of the Month" or "Et Cetera" sections of STORM DATA. We request our subscribers or other interested persons to mail such items to:

Mr. Vince Miller 1464 Wood Thrush Way Marietta, GA 30062

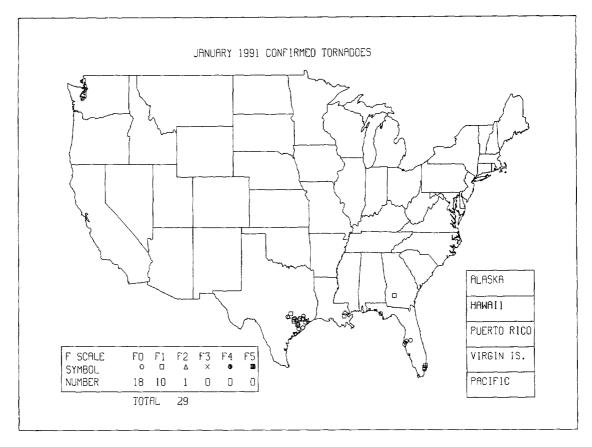
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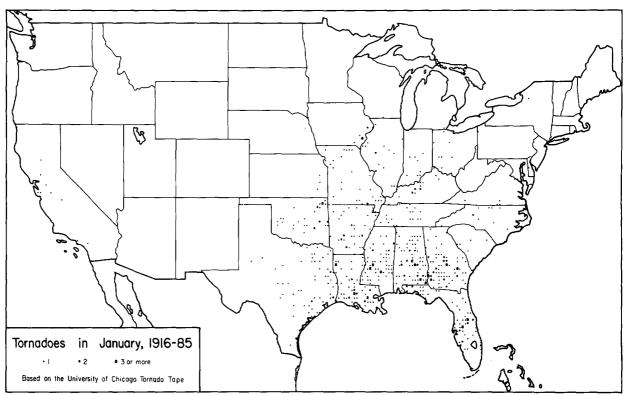
"I certify that this is an official publication of the National Oceanic and Atmospheric Administration and is compiled from information received at the National Climatic Data Center, Asheville, North Carolina 28801."

Director

National Climatic Data Center

OUTSTANDING STORMS OF THE MONTH





1. PRECIPITATION AND TEMPERATURE ANOMALIES - JANUARY 1991

Table 1 lists the 97-year temperature and precipitation rankings for the nine climatically homogeneous regions outlined in Fig. 1. January 1991 finished as the 32nd coldest January 1895 with temperatures since averaging slightly below the longterm mean. A few areas reported warmer-than-normal January average temperatures—the southern two-thirds of Florida, coastal North Carolina, and central Alaska experienced a +4°F departure from normal while northern Maine, parts of the Great Basin, and the central Rockies endured temperatures more than 4°F below normal (See Fig. 4, page 7). Precipitation was slightly above the long-term mean; the 61st wettest January during the past 97 years. Precipitation varied greatly over the United States. Georgia and Florida recorded the wettest January on record since 1895, while Louisiana and Texas observed the third and fifth

TABLE 1. TEMPERATURE AND PRECIPITATION RANKINGS FOR JANUARY 1991, BASED ON THE PERIOD 1895-1991.

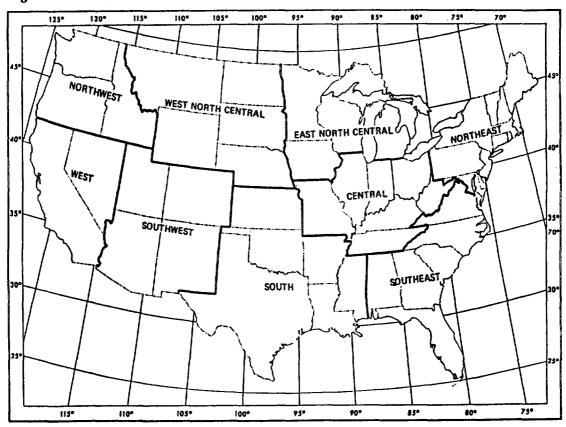
1 = DRIEST/COLDEST, 97 = WETTEST/HOTTEST.

REGION	PRECIPITATION	<u>TEMPERATURE</u>
Northeast East North Central Central Southeast West North Central South South Southwest Northwest West	42 26 38 96 13 89 54 9	53 32 37 65 40 24 27 32 42
National	61	32

From National Climatic Data Center

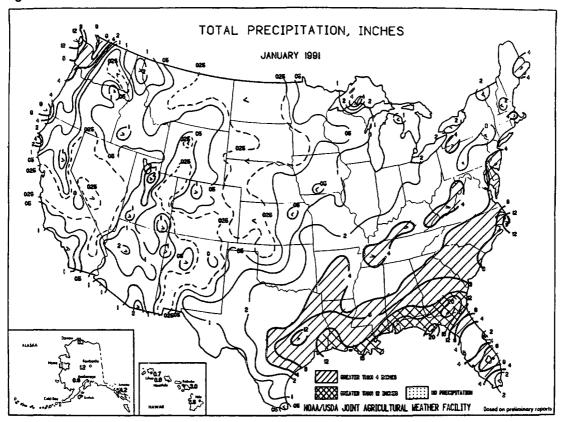
wettest January, respectively. Regionally, the Southeast had the second wettest January in the last 97 years. In contrast, extreme drought continued in California, eastern Oregon, and central Washington. Subnormal precipitation also was observed across the northern Plains, upper Midwest, central Great Plains, and the Rockies. The West, the Northwest, and the West-North Central regions saw the fifth, ninth, and thirteenth driest January, respectively of the last 97 years. The below-normal precipitation across much of the nation offset the wet conditions in the Deep South. (See Figs. 2 and 3 on next page.)

Fig. 1



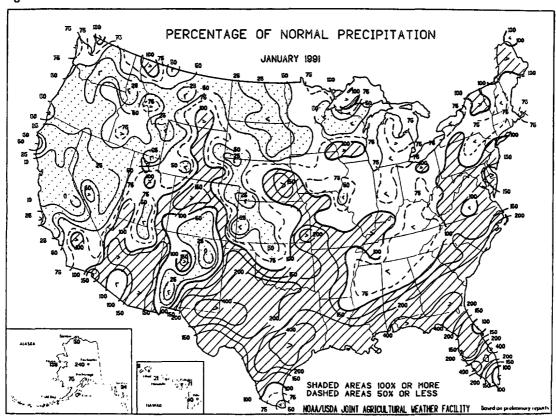
From National Climatic Data Center

Fig. 3



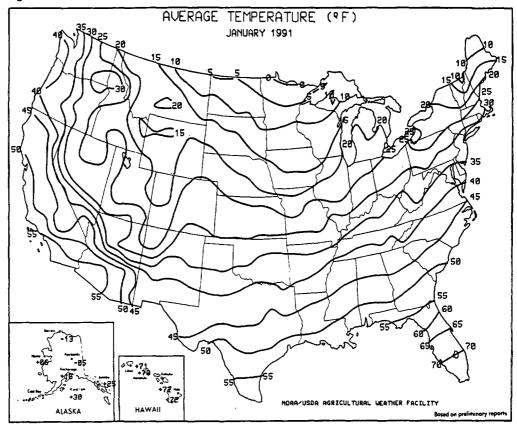
Reprinted from Weekly Weather and Crop Bulletin - February 5, 1991

Fig. 3



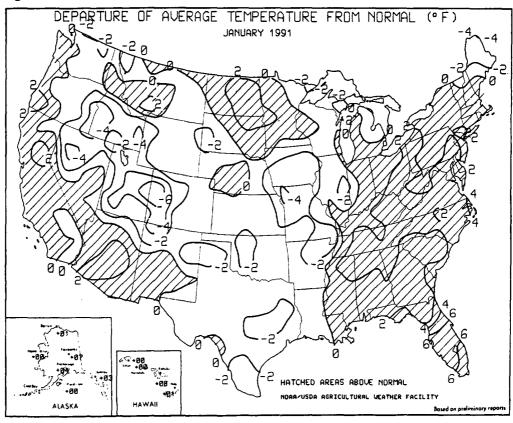
Reprinted from Weekly Weather and Crop Bulletin - February 5, 1991

Fig. 4



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Fig. 5



Reprinted from Weekly Weather and Crop Bulletin - February 5, 1991

2. FLOODING AND COLD CONTINUES IN INDIANA AND ILLINOIS - JANUARY 1-7

Floods from December 1990 continued into much of January. During the last week of December 1990 and the first week of January 1991, the Corps of Engineers estimated flood damage between \$50 to \$100 million dollars. Seventy-two of the 92 Indiana counties were declared disaster areas. The cold temperatures during this time froze the floodwaters and left several inches of ice in homes and on the roads. Similar conditions occurred in eastern and central

Illinois. Most of the region suffered the worst floods in the last 15 to 20 years.

The following photographs are of the flooding event that occurred in Indiana and Illinois. The following eight photos were taken by Steve Sumy on January 3, 1991 at an average flight level of 2,500 feet. (Photos were supplied by Shawn B. Harley, WSFO, Indianapolis.)



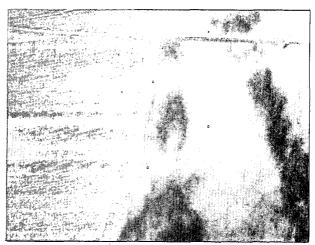
White River—near Highway 41 along Knox and Gibson counties.



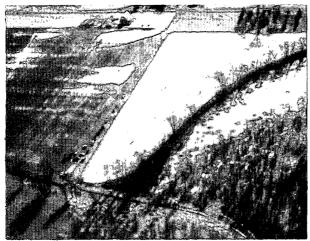
White River—upstream from Hazelton, near Bowman, Indiana.



Agricultural levees failed (near center part of slide) near the east fork of White River.



White River near Edwardsport. Notice where the water is overflowing the levee.



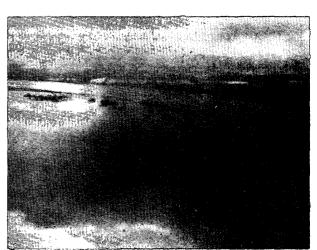
Elnora, Indiana, where the levee failed. Only the outlying areas were flooded; the town itself was not severely affected.



Confluence of White (right) and Wabash rivers (left), looking north.



Flooded farming area just north of Grayville, Illinois.



The Ohio River flooding a peninsula on the Kentucky side just southwest of Evansville. Notice the barges along the near bank of the river.

3. TORNADOES STRIKE TEXAS - JANUARY 14

Thunderstorms developing in southern-central and southeastern Texas produced severe weather along with seven tornadoes, which is a rarity in January in any part of Texas.

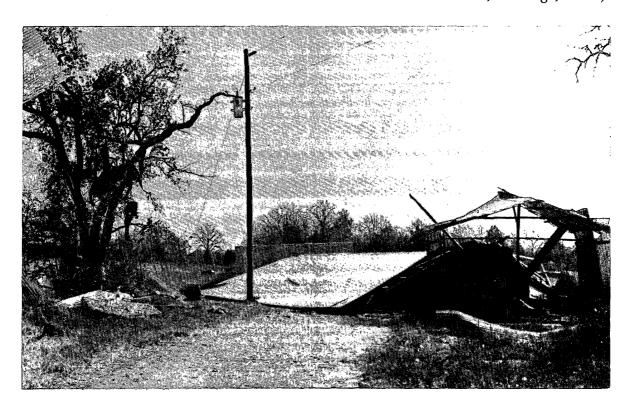
The Bastrop County, TX Department of Public Safety and the Bastrop County Sheriff's Office reported a weak (F0) tornado which lifted and dissipated. Twenty-five minutes later, a strong (F2) tornado formed which damaged three homes; destroying porches and roofs. It also killed young calves in a pasture. Hail up to 2

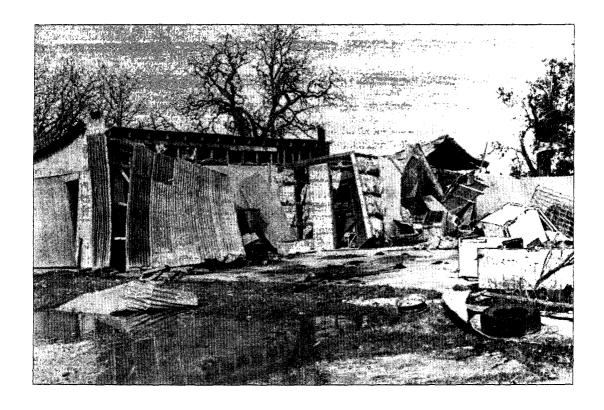
inches in diameter fell before the tornado hit.

A weak (F1) tornado hit a mobile home park in Columbus, TX destroying four mobile homes and injuring several residents; one died 13 days later. Six homes also were lost with damages estimated at \$35,000 per home. The 150-year-old William Harbert Plantation was destroyed. Power lines were knocked down and power was lost for three hours in the city. Total damages were placed at several million dollars. In all, there were 11 injuries and one death due to the tornado.

Tornadoes first struck Lee County at approximately 5:00 p.m. CST on the 14th. Below are photographs of the damage caused by an F1 tornado that struck the Dorman Sell ranch

southeast of Giddings. Notice the large piece of tin (left and top) about 35 feet up in the tree. (Bottom) Damage to a barn on the ranch. (Photo credit: Times and News, Giddings, Texas)







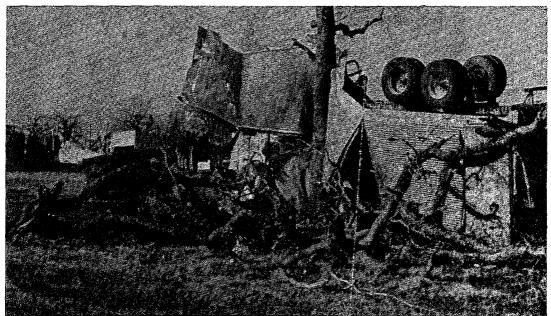
Tornadoes also occurred in Bastrop County. These tornadoes caused no injuries, but destroyed property including the hay barn above. (Photo credit: The Smithville (TX) Times)



Shown here is Mr. Lance Carter picking through the remains of his trailer located in Milentz Trailer Park on Texas Highway 71 in Columbus, TX. His trailer was damaged by an F1 tornado. (Photo credit: The Post, Houston, TX)



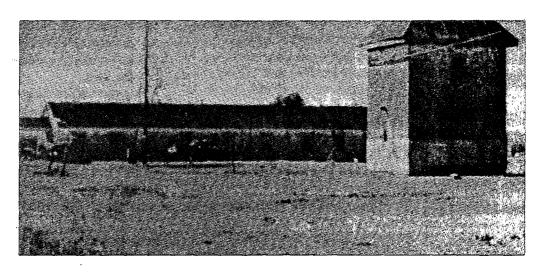
Four trailers were completely destroyed at the Milentz Trailer Park. A large portion of the rubble had been bulldozed before the photo was made. (Photo credit: Headlight, Eagle Lake, Texas)



Property damage in Columbus included this tractor-semitrailer located on Reese Lane east of Columbus.

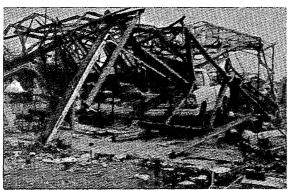
William Harbert's two-story brick smokehouse, built in 1857, was destroyed by a tornado. The building was located on an old county farm east of Columbus on Highway 90. (Photo credit: Colorado County Citizen, Columbus, TX)

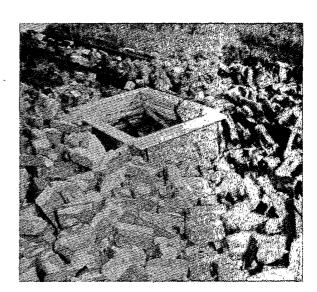
BEFORE...



AFTER...

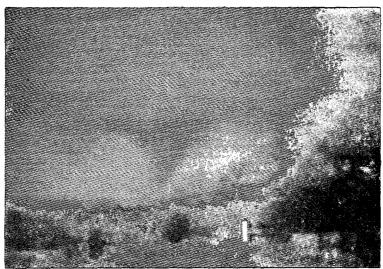






(Above left) Photo is of the one wall of the smokehouse left standing. The photo on the right shows the homemade bricks and a window frame. The window frame is almost 2-feet deep, showing how thick the walls were. The twisted steel girders (left) are all that remain of a large metal building after being hit by the same tornado as the above smokehouse. The metal girders collapsed on the pickup truck. (Photo credit: Colorado County Citizen, Columbus, Texas)

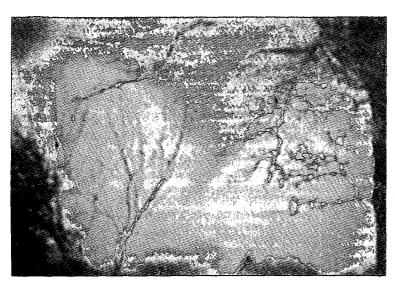
The following three video transfers are of a tornado that occurred in southeastern Bastrop County, Texas. This tornado occurred on January 14th in the afternoon (5:00 p.m. CST). (Photo credit: Donna/Edwin Zimmerhanzel. Tape provided by Troy Kimmel, Chief Meteorologist KVUE-TV, Austin, TX)



Tornado in the early stages of its life cycle.



Tornado is on the ground causing property damage.

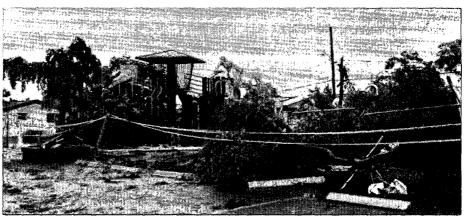


Tornado is lifting and dissipating. It later re-formed and caused more property damage.

4. SUPERCELL HITS MIAMI - JANUARY 15TH

A tornadic supercell was observed at 3:10 p.m. EST over West Miami. Well-defined cyclonic circulation was present in the wall cloud. Tornado touchdown occurred near 3:15 p.m. EST. The tornado hit an elementary school causing light (F0) damage and injuring a teacher. A few minutes later, another tornado caused light tree damage about 2 miles south-southwest of the Miami International Airport. The mesocyclone passed over the airport and then produced a third tornado in Hialeah. The tornado caused weak (F1) damage along a 3.5-mile path: overturning cars, causing three minor injuries, and barely missing a major pari-mutuel race track between 3:35 p.m. and 3:45 p.m. EST. The supercell moved into Broward County where it delivered

the fourth and most intense tornado. Touchdown in Miramar at 3:54 p.m. EST, approximately 1.5 miles south of North Perry Airport. The tornado (F1) then tracked to North Perry Airport and caused 22 aircraft to be destroyed. Hangar damage was limited to roofs, doors, and non-load-supporting walls. The South Campus of Broward County Community College was hit next, causing heavy damage to modular classrooms. The prefabricated metal gymnasium was flattened and one minor injury occurred. The tornado lifted about 4:05 p.m. EST, ending a 2.5-mile path. The mesocyclone, which lasted for over an hour, ended shortly after 4:10 p.m. The supercell injured five people and caused several million dollars in damage.



Downed trees and a moved parking barricade in a neighborhood playground in Miramar, FL. (Photo credit: Photographer - Martin Nelson; supplied by Roger Edwards, National Hurricane Center, Coral Gables, FL)



Damaged and overturned aircraft at the North Perry Airport. (Photo credit: Photographer - Martin Nelson; supplied by Roger Edwards, National Hurricane Center, Coral Gables, FL)

		TIME			NO. PER	OF SONS	ESTII DAM/	MATED AGE		JANUARY 1991
PLACE	D E	LOCAL STANDARD	LENGTH PATH (MILES)	WIDTH OF PATH (YARDS)	KLLED		0.000 wor-y	COCOEN	CHARACTER OF STORM	
ALABAMA										
Mobile County	10	1125CST			0	0	?	?	Thunderstorm W	/ind
	thu	a shipyard i nderstorm v same area.	in Bayou I vinds and 1	a Batre, a moved 10	stee feet.	l plate Swir	e weigh ling, g	hing 3: usty w	50 pounds was pick inds kicked up con	ked up by strong siderable sand in
ARIZONA										
AZZ003 Northeastern Plateau	03- 04	•			0	0	?	0	Ice Storm	
•	abo resi 20s the	ld air was to be. Freezi ulted in thre all day Thu 4th. Nume th. Walkin	ng rain ar e-eighths or ersday the f erous traffi	id freezing of an inch Brd, with 0 c accident	driz glaze .12-i s wer	zle w at Ch nch pi e blar	as wid sinle. recipitated or	lesprea Tempe stion; a the ic	hern Arizona with ad around this area eratures in Winslow mother 0.14 inch feey roads, and there is surfaces.	warm, moist air both days, and remained in the ill in Winslow on was at least one
ARKANSAS										
Randolph County 2 W Biggers	03	Unknown			3	0	0	0	Cold	
	had Ten	been missi	ng since t t night had	he 1st, wi dropped i	th tw	o bod	lies for	und or	ick just west of Big the 4th and the o ens with daytime high	other on the 5th.
Nevada County	06	0100CST- 0600CST			0	0	2	0	Flash Flood	
	Hea	ivy rain cau	sed the clo	sing of pa	rts of	f High	ıways	32, 19	, and 4.	
Grant County	06	0300CST- 0500CST			0	0	2	0	Flash Flood	
	Hea	vy rains flo	oded seve	ral roads a	nd lo	w-wa	ter bri	dges.		
Pulaski County	06	0300CST- 0800CST			0	0	3	0	Flash Flood	
	A re	ecord 4-inch	rainfall fo	r the date i	n Lit	tle Ro	ck clos	sed nur	nerous roads across	Pulaski County.
Lonoke County	06	0300CST- 1100CST			0	0	2	0	Flash Flood	
Prairie County	06	0300CST- 1100CST			0	0	2	0	Flash Flood	
	Hea and clos	vy rains flo	oded roads ains was u igh water.	across bot inder wate Streets w	h cou r. Ir ere f	nties; Lone looder	in Pra	irie Co ounty, e city	ounty, Highway 38 1 Highways 89, 13, of Lonoke.	between Des Arc and 31 were all
Saline County	06	0600CST- 0800CST			0	0	2	0	Flash Flood	

Heavy rains closed approximately nine roads across Saline County.

JANUARY 1991

		TIME			NO.	NO OF ESTIMATED PERSONS DAMAGE		AATED AGE		JANUARY 1991
PLACE	DA	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-LLWD	סשאכניציו	0.000.W00->-	COCOCO	CHARACTER OF STORM	

CALIFORNIA, Northern

Kern County 10 0300PST-	2	8	0	0	Dense Fog
San Joaquin County 1200PST	2	0	0	0	Dense Fog
Stanislaus County	1	0	0	0	Dense Fog

Dense fog in the San Joaquin Valley reduced visibilities to near zero. A 22-car pileup in Kern County resulted in two deaths, while single-car accidents in San Joaquin and Stanislaus counties caused three more deaths.

Southern Sierra Nevada and Tehachapi Mountains

16 0700PST-1900PST

Strong winds were induced by a pressure gradient between a high-pressure system in the Great

High Wind

Basin and a low-pressure system in Arizona.

Kern County

21 0045PST-1245PST 0 0 3 0 High Wind

Santa Ana conditions produced sustained winds to 60 mph in the southern San Joaquin Valley.

CALIFORNIA, Southern

CAZALL

16 All Day

0 1 ? 0 High Winds

Strong, gusty Santa Ana winds caused by a high-pressure system over Nevada and Utah, combined with an upper low-pressure system over Arizona, hit all of southern California. At 0250 PST, an estimated wind gust to 60 mph was reported at Rancho Cucomonga. Other wind reports included: 65 mph at March Air Force Base, 55 mph just off Point Dume, 50 mph at Mt. Wilson, and 45 mph at Ontario. The high winds in western Riverside County felled seven power poles in Mira Loma injuring a city worker. Some 8,000 customers in Corona, Norco, Mira Loma, and Ontario were without power. In Riverside, the winds cut power service to 3,000 to 4,000 customers. In the San Fernando Valley of Los Angeles County, winds to 60 mph snapped 13 power poles in Sylmar causing loss of power to some 4,000 customers. In Orange County (mainly in Costa Mesa and Santa Ana), more than 7,000 customers lost power.

COLORADO

COZ001-002-003-004-007-008-009 Western Colorado Mountains and San Luis Valley

04-05

0 0 0 0 Heavy Snow

Heavy snow fell across most of the western two-thirds of the state, as a slow-moving winter storm tracked across the Rockies during the two-day period. Snowfall amounts ranged from 5 to 7 inches in the western and San Luis Valleys, to 12 to 24 inches in the mountains. Snowfall totals for the two days included 5 inches at Rangely (northwestern Plateau) and Alamosa; 7 inches at Fruita (near Grand Junction); 14 inches at Crested Butte and Telluride Ski Areas; 18 inches at Gothic Mountain, Irwin Lodge, and Pagosa Springs; 21 inches at Purgatory Ski Area, and 28 inches at Wolf Creek Ski Area. Of note was 20 inches of snow which fell at Durango.

COZ002-004-008 Northern, Central and Southwestern Mountains

13 0000MST-14 1500MST

0 0 0 0 Heavy Snow

The mountains received a quick, heavy snowfall, with totals ranging from 5 to 20 inches. Most areas received 12 inches or less. The higher snowfall totals were 21 inches at Steamboat Springs; 17 inches at Loveland; 15 inches at both Beaver Creek and Vail. Other amounts included 11 inches at Telluride; 10 inches at St. Paul; 9 inches at Copper Mountain; 7 inches at Arapahoe Basin; and 5 inches at Berthoud Pass.

JANUARY 1991

		TIME			NO.	OF SONS	EST I	AATED AGE	
PLACE	D A E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	Kirrin	Omwer Z.		CECOEN	CHARACTER OF STORM

COLORADO Cont'd

COZ002-004-011 Northern and Central Mountains and Front Range

1200MST-17 1800MST Heavy Snow

A Pacific storm system moved across the state, producing snow across the northern and central mountains and the Front Range. Snowfall amounts ranged from 5 to 10 inches with some local amounts up to 20 inches. Along the Front Range, snowfall totals were in the 3- to 6-inch range. Mountain-area snow totals included 20 inches at 7 Utes; 15 inches at Vail; 10 inches at Mary Jane Ski Area; 8 inches at Berthoud Pass; and 6 inches at Arapahoe Basin. Along the Front Range amounts included 7 inches at South Platte Station; 4 inches at Arvada and Buckhorn Mountain; and 3 inches at Aurora, Lafayette, and Castle Rock.

COZ011-014-015 Front Range, Southern Foothills, and Pikes Peak/ Palmer Divide

0900MST-20 1200MST 0 0

A strong cold front moved through the northeastern part of the state on the morning of the 19th and continued southward through the southeast. Upslope conditions produced 3 to 6 inches of snow along the eastern Front Range. Snow totals included 7 inches at Cuchara; 5 inches at Denver Stapleton Airport, Westminister and Rye; and 4 inches at Thornton and Limon.

0

0

Snow

COZ011-014-015 Front Range, Southern Foothills and Pikes Peak/ Palmer Divide

1200MST-29 1200MST 0 0 Snow

A cold front and an associated upper-level disturbance triggered upslope snows across the eastern Front Range. Snowfall totals ranged from 3 to 5 inches. Snowfall amounts included 5 inches at Loveland and Bellvue; 4 inches at Aurora, Broomfield, Fort Collins, and Buckhorn Mountain; and 3 inches at New Raymer and Rye.

CONNECTICUT

CTZ001-002-003 Northern Connecticut 12 0300EST

1200EST-

Heavy Snow O 0 0

Snow accumulated from 5 to 7 inches across the northern portion of the state and resulted in numerous (mostly minor) skidding accidents. There was an early-afternoon closing of some schools and businesses on the 11th in anticipation of travel problems later that afternoon.

Fairfield County Wilton

16 2250EST

0 3 Lightning

A bolt of lightning struck a house, blowing four holes in the roof. Although there was no fire, the interior of the house sustained additional damage. Thunderstorms during January are rather rare, occurring once every 2 or 3 years.

New Haven County Meriden

2315EST-2345EST 16

0 0 3 Lightning

An unusual January thunderstorm produced a blaze of lightning and roaring thunder which startled area residents, and set off numerous fire and burglar alarms in Meriden and surrounding towns. About two dozen bricks were knocked from the corner of a four-story building by a bolt of lightning. Scattered power outages were reported.

DELAWARE

DEZ003

0200EST-1900EST

5 0 Heavy Snow Glaze

About 5 inches of snow fell across northern Delaware, mixed with freezing rain. The freezing precipitation caused power outages to more than 20,000 people in northern New Castle County.

JANUARY 1991

		TIME			NO.	OF SONS	EST II	ATED IGE	
PLACE	DAG	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-(Line)		4-00m100x10	WTOW	CHARACTER OF Storm

FLORIDA

Escambia County Santa Rosa County 10 1315EST-1330EST

0 0 2 0 Thunderstorm Wind (G50)

Strong thunderstorm winds blew most of the roof off a commercial office building. Billboards and trees were toppled, and power lines were knocked down.

Dade County Miami Area

15 1515EST 0.5 40 0 1 3 0 Tornado (F0)

A small tornado struck an elementary school building 3 miles south of Miami International Airport, peeling off part of its metal roofing and uprooting trees. A female teacher was picked up and flung to the ground; she had minor injuries. The tornado lifted back into the clouds for several minutes, then dropped from its parent cloud to cause minor tree and power line damage 2 miles south of the airport. The tornado dissipated just before the parent storm moved across the airport.

Dade County Hialeah

15 1535EST-1546EST 4.0 60 0 3 5 0 Tornado (F1)

A tornado touched down in Hialeah about 2 miles north-northeast of the Miami International Airport (from the same thunderstorm system causing the previous F0 tornadoes) at about 1535 EST. Trees were uprooted and power lines taken down; utility sheds and carport roofs were blown apart and several cars were overturned. The sheet metal roof was peeled off the United Parcel Service truck terminal building, and an outdoor flea market was damaged. The tornado lifted back up into the cloud as it passed just east of Opa Locka Airport at 1546 EST.

Broward County Hollywood

15 1554EST-1605EST 3.5 60 0 1 6 0 Tornado (F1)

A tornado touched down in Hollywood overturning a truck and damaging house roofs and utility sheds. Trees were uprooted, power lines knocked down, and fences blown down. Boats and trailers were moved several feet. The tornado continued northeast across North Perry Airport. Twenty-two small planes were flipped over and suffered varying degrees of damage; most either destroyed or with significant damage. Two aircraft had doors blown in and roof damage. The tornado then struck Broward Community College where several modular classrooms were damaged, a pre-fabricated metal building was destroyed, and large trees were uprooted. One person suffered minor injuries. The tornado continued northeast, near a residential subdivision before dissipating.

Duval County Orange County St. Johns County

16 1005EST 0 0 1 0 Thunderstorm Wind

Strong thunderstorm winds damaged a home in Fruit Cove (St. Johns County). Two large plate glass windows were shattered and lawn furniture was blown into the pool. Several cars were blown a few feet by winds in Mandarin (Duval County). Pea-size hail fell at Ponte Vedra Beach (St. Johns County).

FLZ009-01-013-015-018 Clay, Highlands, Hillsborough, Lee, Pasco, Pinellas, Polk, Sarasota, Sumter Counties

19 2205EST-20 0155EST 0 5 6 2 Thunderstorm Wind

A line of strong thunderstorms, associated with a cold front, moved through northern and central Florida. Some of these storms were severe, resulting in damaging wind gusts, and in several cases, small tornadoes. Near New Port Richey (Pasco County) at 2225 EST, numerous mobile homes were damaged or destroyed. Some billboards and power lines were knocked down. Four people received minor injuries when a car hit the rear of another car which had rammed a tree felled across the road by thunderstorm winds. Near Clearwater and Safety Harbor (Pinellas County) at 2240 EST, trees and power lines were downed. Near Holiday (Pineallas County) at 2245 EST, a shed was destroyed and a mobile home damaged. At Tampa Bay Downs

JANUARY 1991

		TIME			NO. PER	OF SONS	ESTII DAM/	MATED AGE	
PLACE	DAO-E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-L-LWO	CHINCLZ		CECODA	CHARACTER OF STORM

FLORIDA Cont'd

(Hillsborough County) at 2250 EST, a barn was damaged, and two horses suffered injuries and had to be destroyed. One person was also injured. Near Lutz (Hillsborough County), trees and power lines were knocked down. A tornado was spotted by the public at 2300 EST in northern Tampa. A tornado was also spotted by Civil Defense, midway between Gulfport and South

	upriver Couloff a fe At suff from was nor pow Day	ooted and powe blown off gainty at 2335 E. a mobile homew miles east of 2350 EST in fered roof dam in a home in near smashed to specific the form of Mulberry ver lines, and the repport. The	rer lines know a rages and ST. In Nor e and depo of Sarasota Lakeland, age. Sever orthern Lalolinters. All mobile hon door on a con Park in	ocked ar trailer he th Lake sited liv (Sarasota a porch al parked keland. lso in Po west of nes suffe church re Highlan	ound omes land (re wir a Cou was d cars At 22 lk Co Lake cred dectory ds C	at 233. Tree Polk (es on inty), s blown were swere land. lamage build ounty	5 EST is and County top, to several away turned ST in 1 at 2355 From near ling wat 010	Dight Down Comments of the Com	City (Pasco Counfy), it metal roofs and screen lines were downed in r 40 EST, wind gusts rip gone person inside. As suffered roof and screan house and several ned. Lawn furniture was ity (Polk County), a witrees and power lines were only on the county of	n enclosures rural Sumter ped the roof it 2346 EST een damage. earby homes blown away ooden fence evere downed bunty, trees, Wales, and Trees were
Hillsborough County North Tampa	19	2300EST	0.5	30	0	0	0	0	Tornado (F0)	
		mall tornado w sipated withou				dama	ge to t	rees, p	ower lines, and roofs.	The tornado
Pinellas County Gulfport	19	2308EST	0.5	30	0	0	0	0	Tornado (F0)	
	A s	mall, short-liv	ed tornado	downed	l tree	s and	power	lines.		
Polk County Lakeland	19	2350EST	0.8	40	0	0	3	0	Tornado (F0)	
	froi the	n a house, and	d roof dam tion. Law	age to s n furnitu	evera	ıl nearl as blov	by hor vn awa	nes. S	n a screen porch being Several parked cars we home about 0.50 mile	re turned in
St. Lucie County Fort Pierce	20	0317EST			0	0	1	0	Thunderstorm Wind	
		tal roofing was		f a buildi	ing b	y thun	dersto	rm win	d gusts. Some tree and	l power line
Alachua County Alachua	24	1620EST			0	0	3	0	Thunderstorm Wind	
	Stro trail trac	ong wind gust lers were dam tor-semitrailer	s hit a mo aged and o was overt	bile hor one dest urned or	ne pa royed 1 Inte	rk up l when rstate	rooting a fal 75 jus	g trees ling tre t south	and downing power lee chopped the trailer of Alachua.	ines. Four in half. A
Alachua County	24	2020EST			0	0	1	0	Hail (1 00)	

0

2

Large hail fell for a short time 10 miles south of Gainesville.

Bay County Panama City

30 1330EST

0.4

30 0 0 Waterspout Tornado (F0)

A waterspout moved onshore, damaging a roof and uprooting several trees.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST IN	ATED GE	
PLACE	D	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	KILL	T N J J D M M D		COCOEN	CHARACTER OF STORM

GEORGIA

Cook County Adel

11 Morning 0

0 ? ? Flash Flood

A 12-block area of Adel was flooded as heavy rainfall pushed the town's drainage beyond its capacity.

GAZ008-015 Southern Georgia

15 2300EST-17 0000EST

0 0 ? ? Heavy Rainfall

With soils already saturated from heavy rainfall over the southern part of the state during the previous week, nearly 1 to 2 inches of rain fell over the southern counties by the 17th. Several rivers and creeks were pushed near their flood stages. Considerable soil erosion occurred.

As waters flowed downstream and with additional rainfall on the 19th, several areas began flooding during the next week.

Lowndes County Valdosta

19 2000EST-31 2400EST

0 0 ? ? Flood

On the 19th, 2 to 3 inches of rain fell over Lowndes County. The Withalacoochee River began to rise quickly. By 2000 EST, several roads around Valdosta were flooded; the dirt roads over the areas suffered the greatest damage. Low-lying agricultural lands along the river south of the city were also under water.

The Withalacoochee first crested at 16.6 feet early on the 24th. Flood conditions became more complicated on the 29th when heavy showers developed over the area. The river crested at 19.5 feet on the 31st. The flood stage at Valdosta is 13 feet.

Tattnall County Reidsville

20 1200EST-31 2400EST

0 0 ? ? Flood

The Ohoopee River flooded near Reidsville and inundated low-lying agricultural and timber lands. The river rose to 15.5 feet by the 31st; flood stage at Reidsville is 11 feet.

Thomas County Thomasville

20 1200EST-

23 1000EST

0 ? ? Flood

Heavy rainfall over the already-saturated soils of southern Georgia pushed the Ochlockonee River up at Thomasville. The river rose out of its banks by the 20th and flooded nearby roads and low-lying areas.

Brantley County Atkinson

22 0700EST-

31 2400EST

0 0 ? 3 Flood

The Satilla River at Atkinson rose to 19.4 feet by the 31st. The river flooded timber lands, county roads, fishing camps, and low-lying agricultural concerns; flood stage at Atkinson is 13 feet.

Ware County Waycross

3

23 0700EST-

31 2400EST

0 ? 3 Flood

The Satilla River at Waycross rose to 19.3 feet by the 31st. Several fishing camps and riverside agricultural concerns were flooded. Flood stage at Waycross is 16 feet.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST II	MATED AGE	
PLACE	DA E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-L-WD	OmbC.21	4- 00 m00x0	೧ಹ೦ಕಿಬ	CHARACTER OF STORM

GEORGIA Cont'd

GAZ001-GAZ004 Northern Georgia 24 0330EST-1600EST

0 0 ? ? Heavy Snow

Heavy snow developed over northern Georgia and blanketed the area as far south as the northern suburbs of Atlanta and Athens. Accumulations of 2 to 4 inches were measured over the northern suburbs of Atlanta. In the mountains of northwestern Georgia, 6 to 8 inches accumulated. In extreme northwestern Georgia and over the area south of an Atlanta-to-Athens line, accumulations were generally 1 inch or less.

Extremely hazardous driving conditions developed in the snow (due to icing on the roads), especially in Hall, Forsyth, Dawson, Union, Towns, and Cherokee counties. Thousands of students were dismissed from classes and many businesses were closed because of road conditions. The weather-slicked roads caused countless automobile accidents, some resulting in fatalities and injuries.

Scattered power outages occurred in Hall and Jackson counties when snow-laden limbs fell over wires.

Colquitt County Northeastern Colquitt County

24 0700EST-2030EST

0 0 3 ? Flash Floods

Heavy, continuous rainfall over already-saturated soils produced flash flooding over parts of Colquitt County. Several dirt roads suffered major damage and were closed.

Screven County Dover

24 0700EST-31 2400EST

0 0 ? ? Flood

The Ogeechee River rose above its flood stage of 7 feet and flooded surrounding agricultural lands, timber, and access roads.

Effingham County Eden

24 0700EST-31 2400EST

0 0 ? ? Flood

The Ogeechee River flooded access roads, timber, and farmlands around Eden as it rose to 10.7 feet by the 31st; the flood stage is 9 feet.

Appling County
Northern Appling
County
Toombs County
Southern Toombs
County

24 0700EST-31 2400EST

0 ? 4 Flood

24 0700EST-31 2400EST

0 0 ? ? Flood

The Altamaha River flooded at Plant Hatch, north of Baxley. Low-lying agricultural and timber lands were flooded as the river rose to 76.6 feet by the 31st; flood stage at Plant Hatch is 74.5 feet. The high water washed out an earthen dam and caused minor flooding in portions of Baxley.

Thomas County Thomasville

24 0800EST-31 2400EST

0 4 ? Flood

Heavy rainfall developed over southern Georgia and pushed many area creeks and rivers to near bankfull. By the morning of the 25th, 4.12 inches of rain had fallen at Thomasville. The Ochlockonee River rose rapidly and then crested at 17.9 feet on the 25th.

Additional heavy rainfall on the 29th aggravated flooding along the Ochlockonee River.

JANUARY 1991

		TIME			NO.	OF SONS	EST IN	MATED NGE	
PLACE	D E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K L L E O	Om2012-	4-00m00x00	റയാന	CHARACTER OF STORM

GEORGIA Cont'd

River access roads, riverside residential areas, and streets were flooded around Thomasville; mobile homes were evacuated. Considerable road damage occurred over north-central Thomas County. The flood stage on the Ochlockonee River is 15 feet at Thomasville.

Jenkins	County
Crark	າກາ

25 0700EST-31 2400EST

0 ? ? Flood

The Ogeechee River rose to 9.3 feet at Scarboro by the 31st. Riverside agricultural lands were flooded. The flood stage at Scarboro is 8 feet.

Echols County Statenville

26 0700EST-31 2400EST

0 4 ? Flood

Timberlands, farms, and pastures were flooded at Statenville as the Alapaha River rose to 28.5 feet by the 31st. The flood stage on the Alapaha at Statenville is 24 feet. Along the river, about eight residences were evacuated as water flooded them on the 31st.

GAZ008-GAZ015 Southern Georgia Colquitt County	29 30	1900EST- 1645EST	0	0	4	3	Heavy Rainfall
Countywide	29 30	1900EST- 0800EST	0	0	4	?	Flash Floods
Brooks County Countywide	29 30	1900EST- 0800EST	0	0	4	?	Flash Floods
Thomas County Thomasville	29	1900EST-			•		
Lowndes County	30	0800EST	0	0	4	?	Flash Floods
Valdosta	29 30	1900EST- 0800EST	0	0	5	?	Flash Floods
Pierce County Countywide	29 30	1900EST- 0800EST	0	0	3	?	Flash Floods
Bacon County Countywide	29	1900EST-	Ū	U	,	•	TIASH TICKAS
Coffee County	30	0800EST	0	0	4	?	Flash Floods
Countywide	29 30	1900EST- 0800EST	0	0	4	?	Flash Floods
Brantley County Countywide	29	1900EST-	•	^	0	0	7711-7711-
Ware County	30 29	0800EST 1900EST-	0	0	?	?	Flash Floods
Countywide Bulloch County	30	0800EST	0	0	4	?	Flash Floods
Countywide	29 30	1900EST- 0800EST	0	0	4	?	Flash Floods

Moisture-laden air from the Gulf of Mexico, combined with a near-stationary frontal system over northern Florida and an approaching cold front from the west, produced moderate to heavy rainfall over southern Georgia. With the ground already saturated from previous rainfall, the precipitation quickly aggravated existing flood conditions and produced many incidents of flash flooding over the area. Considerable soil erosion occurred over agricultural lands and a few earthen dams on farm ponds gave way.

By 2300 EST on the 29th, the heavier rainfall was tapering off; yet, by 0800 EST on the 30th, more than 2 inches of rain had occurred at many locations.

JANUARY 1991

		TIME			NO.	OF SONS	ESTIN DAM/	AATED NGE	
PLACE	DA)-E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	Killino	חשטטכריב ו		NOOOO	CHARACTER OF STORM

GEORGIA Cont'd

Consistent rainfall continued into the 30th. Scattered thunderstorms developed during the afternoon with localized heavy rain. By 1645 EST, flash flooding was widespread and numerous roads were inundated. Two to 3 inches of rain were common across the area. Isolated amounts up to 5 inches were possible in the rainfall from the 29th through the 30th.

With low-lying areas flooded and many unpaved roads damaged, schools were forced to close in Brooks, Pierce, Bacon, Coffee, and Ware counties.

In northeastern Colquitt County two roads sustained major damage and one home around Indian Lake was flooded. Flooding developed over southwestern Colquitt County along the Ochlockonee River.

With flood conditions already occurring along the Withalacoochee River and over 3 inches of rainfall over Lowndes County, water rapidly backed up into residential sections of Valdosta and entered a few homes. By 2030 EST, numerous roads were closed and several other creeks in and around Valdosta were flooding; only one evacuation had occurred. By 2240 EST the conditions worsened; roads were impassable over a large portion of the county and water entered a few homes.

The flash floods aggravated existing conditions around Valdosta on the Withalacoochee River, and around Thomasville on the Ochlockonee River. Both rivers remained flooded through the end of the month, severely hampering farming and logging operations in the area.

In southern Pierce County, Boight's Bridge sustained minor damage due to flooding on the Alapaha River. In Brantley County residents in several areas were marooned by the waters; in Ware County seven roads were damaged. Over Bulloch County a large number of septic tanks failed, and dirt roads were damaged.

GAZ006 & GAZ009 Central Georgia	30	0700EST- 1900EST	0	0	?	3	Heavy Rainfall
Peach County Fort Valley 4 E Fort Valley	30 30	1155EST 1205EST	0	0	?	?	Flash Floods Flash Floods
Houston County Warner Robins Perry	30 30	1210EST 1215EST	0	0	4	?	Flash Floods Flash Floods
Countywide Twiggs County Countywide	30 30 30	1215EST 1215EST	0	0	4 3 4	? ?	Flash Floods Flash Floods
Bibb County Countywide	30	1215EST	0	0	?	?	Flash Floods

Heavy rainfall with embedded thunderstorms developed over much of central Georgia, with rainfall amounts over 5 inches in some portions of middle Georgia. As a result, urban and street flooding developed, and road damage and soil erosion occurred over central Georgia.

In Peach County, Georgia Highway 96 east of Fort Valley was inundated while several other roads were partially flooded. Many roads were flooded in Twiggs County. In the eastern portion, a house was flooded and Georgia Highway 358 was closed.

Flash floods developed over Bibb County and by 1230 EST, portions of Georgia Highway 247 were impassable in the southern portion of the county. Although the rain had diminished by 1645 EST, Macon received over 4.50 inches of rainfall by 1900 EST.

Approximately 23 roads over Houston County were closed due to flooding along area creeks, including Bay Gall Creek. An apartment building was flooded in Warner Robins; several homes had water in the basements and a few vehicles sustained damages in Perry and Warner Robins, forcing evacuations.

JANUARY 1991

		TIME			NO.	OF SONS	ESTIN DAM/	AGE	
PLACE	DA)	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	V-LLENO	סיים הביז	4-88m00x00	NTORO.	CHARACTER OF Storm

GEORGIA Cont'd

Dougherty County Albany 7 E Albany

30 1159EST 30 1215EST 0 0 ? ? 0 0 7 ?

Thunderstorm Wind (G52) Thunderstorm Wind

Small Hail

Scattered power outages occurred when strong thunderstorm winds tore down large tree limbs just north of Acree, about 7 miles east of Albany; small hail also developed. The storm moved due east into Worth County and produced a tornado.

Worth County 10 E Albany to 5 N Sylvester to 5 NE Sylvester

30 1220EST-1230EST 0.1

60 0

4 ? Tornado (F1)

A small tornado developed about 1220 EST near the rural community of Red Rock, 10 miles east of Albany. Several trees were uprooted and power was disrupted, before the tornado lifted back into the parent thunderstorm and moved due east over mostly agricultural land toward Isabella.

At 1225 EST the tornado was at Isabella, 5 miles north of Sylvester; several vehicles were damaged by the storm when trees fell upon them. Roofs were torn from a few buildings and garages. Power in the area was disrupted before the tornado lifted again and skipped easterly to near Shingler.

At 1230 EST, the worst damage occurred 5 miles northeast of Sylvester, near Shingler. More large trees were uprooted and power was disrupted when the tornado briefly touched down and traveled over two farms. The storm damaged a large steel building worth about \$20,000 and unearthed a 250-gallon propane tank on one farm. On the other farm a barn, worth about \$15,000, was destroyed. Total damages at Shingler were estimated to be about \$40,000.

Although the thunderstorm which produced the cell traveled over a path of about 10 miles, the tornado was only on the ground briefly. The storm's longest damage segment (only 400 yards) occurred at Shingler.

Tift County
3 ENE Sunsweet

30 1300EST

0 0

?

Thunderstorm Wind

Thunderstorm winds tore down large tree limbs and power lines near the Turner-Irwin County lines in northern Tift County. Debris was scattered over several yards of roadway.

?

Wilkinson County Gordon
Baldwin County Milledgeville
Crisp County Southwest Crisp
County
Laurens County Dublin
Countywide Crawford County
Countywide Bleckley County
Countywide
Dodge County Countywide

30	1300EST	0	0	?	?	Flash Floods
30	1300EST	0	0	4	?	Flash Floods
30	1300EST	0	0	3	5	Flash Floods
30 30	1300EST 1300EST	0	0	4	?	Flash Floods Flash Floods
30	1300EST	0	0	3	?	Flash Floods
30	1400EST	0	0	4	?	Flash Floods
30	1400EST	0	0	?	?	Flash Floods

With heavy rains continuing over middle Georgia amounts over 3 inches were common. Several areas were inundated during the afternoon with the heavy rainfall diminishing over middle Georgia by 1645 EST.

A few homes in isolated areas of Milledgeville suffered flood damage. At Gordon in Wilkinson County, several streets were flooded and small streams were out of their banks.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST II	AATED AGE	
PLACE	D	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	Kirrino	סיינא האיני האיני האיני	4-80m 4020	COCODO	CHARACTER OF STORM

GEORGIA Cont'd

In southwestern Crisp County, at least seven families were marooned when a dirt road was washed out. A few paved roads were damaged and fields were eroded. An earthen dam on a farm pond in the Hatley community washed out, unearthing several trees.

At Georgia Highway 257 in Laurens County, heavy rainfall caused hundreds of gallons of diesel oil to spill, as two new tanks with 14,000 gallons total capacity were being installed at a truck stop. A trailer park in Dublin was flooded and several roads were damaged or impassable. In Crawford County, several secondary roads were flooded with a few sustaining minor damage.

Dirt roads were damaged in Bleckley and Dodge counties closing schools due to road conditions. Repair costs to the roads in Bleckley County were estimated to be about \$5,000.

Bryan	County
Cour	itvwide

30 1400EST

3 ? Flash Floods

Heavy rainfall produced flash floods, damaging several dirt roads across the county.

Webster County Preston

1000EST-2400EST

? ? 0 0 Flood

The Kinchafoonee Creek rose above flood stage and caused widespread flooding of access roads and low-lying areas at Preston. The creek crested at 8.3 feet on the 31st; flood stage on the Kinchafoonee Creek is 7 feet at Preston.

IDAHO

IDZ001-002-003-004-012 Snake River Valley and Southeastern Idaho 01-31

? ? ? Extreme Drought

The precipitation deficit during January was 4 to 9 inches, and snowpack was 50 percent of normal. The shortage of snow was associated with a 50 percent loss of business at Sun Valley. Continued drought will extend the largest insect epidemic in Idaho's history.

IDZ001-002-003-004-005 Southern Idaho

O Cold Spell

Sub-zero minimum temperatures were experienced each day. The last two weeks of December and the first week of January is the longest period on record at Boise without a thaw. Ice jamming on the Snake River was troublesome. About 5 percent of dairy herds were slaughtered due to frozen teats. (See December 1990 Storm Data for additional damages).

IDZ001-003 Southern Idaho

100 ?

Air Stagnation

Heavy Snow

Due to air stagnation, pollutants collected in the air to unhealthful concentrations. A steady stream of persons came to the emergency wards of hospitals with respiratory problems. Wood burning was banned, and dense smog caused some commercial flights to be canceled or delayed on the 4th and 8th. Dense smog closed the Boise Airport for most of the day on the 9th.

IDZ011-008-009-011 06 1900PST-Northern Idaho 08 0700PST

0 0 0 O

Up to 18 inches of snow fell in 36 hours.

IDZ006 Western-Central Idaho

0600MST-

O 0 0 1730MST Heavy Snow

Council received 8 inches of snow.

		Т			NO	OF.	FSTI	MATED		JANUARY	1991
		TIME	LENCTH	UIDTU		SONS		AGE		ļ	
PLACE	DA E	STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	KTLLED	Omac L.z.	-camao->	NAC)AN	CHARACTER OF STORM		
IDAHO Cont'd										-	
IDZ001 Southwestern Idaho	07	0800MST			0	0	5	0	Snow		
	Nu	merous acci	dents were	reported	on In	terstat	te-84 d	lue to	2 or 3 inches of sno	ow.	
IDZ004 Southeastern Idaho	07 08	1900MST 0700MST			0	0	0	0	Heavy Snow		
	Fiv	e inches of	snow fell.								
Idaho County Lowell 35E	08	1000MST			0	0	4	0	Avalanche		
	He: 12	avy snowfall under 18 fe	l and warm et of snow	ing tempe	rature	s caus	sed ava	lanche	es to hit a truck, and	buried Hig	hway
IDZ001-006 Southwestern Idaho	10	0630MST			1	1	5	0	Light Snow		
	On blo spi	e death occu cked for 8 lling 20 tons	urred on H hours at G s of potato	ighway 55 owen Roa products	at C d wh onto	arder en a the ro	ia due jackkn adway	to slip ifed tr	ppery roads. Inters uck was struck by	tate 84 Eas another vel	t was nicle,
IDZ006-007 Southwestern Idaho	11 12	1800MST 1800MST			0	0	0	0	Heavy Snow		
	Cer Hig	nterville rep ghway 21 ov	orted 6 inc ver Banner	hes of wet Summit to	snov	v cont	taining sable t	1.26 hrough	inches of water. At the 15th.	valanches ca	aused
IDZ001 Southwestern Idaho	12	0800MST- 1600MST	-		0	0	5	0	Urban Flooding		
		nalf inch of a oding.	rain on mel	ting snow	flood	ed so	me Boi	se base	ements; frozen drair	is aggravate	d the
IDZ001-002-003 Southern Idaho	14	0715MST			1	0	5	0	Light Snow		
	side Fer	eways hitting	g a pole. A	A tractor-se	emitra	uler ja	ickkni	fed on	ear Idaho Falls when snow-packed Inters susing the interstate	tate 84 at G	enns
IDZ012 Southeastern Idaho	28	0400MST- 2030MST			0	0	0	0	Blizzard		
	A	combination	of wind,	snow, and	extre	me w	ind ch	ill clos	sed schools.		
ILLINOIS											
ILZ007-015 Fastern and					0	0	6	7	Flood		

Eastern and Central Illinois

Flooding from December continued through much of January. Some of the rivers most affected were the Kankakee, Vermilion, Sangamon, Embarrass, Wabash, Little Wabash, Saline, Big Muddy, Cache, and all along the Ohio. Many of these areas suffered the worst flooding in the last 15 to 20 years.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST II	MATED AGE	
PLACE	D	LOCAL	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K I L	OTTO CAR	- 	COCODO	CHARACTER OF STORM

ILLINOIS Cont'd

ILZ001-012 Most of Illinois

01-06

0 0 6 4 Winter Storms

A series of snow and ice storms occurred in the first week of January over much of Illinois. All but the southern part of Illinois had snowfalls of 3 to 6 inches, at times mixed with freezing rain and freezing drizzle. Along with snow and ice the Arctic air mass over the area caused low temperatures down to single digits, and occasionally single digits below zero Fahrenheit.

ILZ0001-015 Statewide 10-12

0 0 6 4 Winter Storms

Beginning late on the 10th and continuing through the 11th to the 12th, snow and freezing rain fell over Illinois. Central Illinois was especially hard hit by freezing rain with power lines and trees suffering extensive damage. Snowfalls ranged from 5 to 7 inches for the northern two-thirds of the state, mixed with sleet and glaze, and lesser amounts in southern Illinois.

ILZ009-014 Southern Half Illinois 28-29

0 0 6 4 Winter Storm

A winter storm caused snow and freezing rain over the southern half of Illinois. Power lines and trees suffered heavy damage. Other than an accumulation of ice, the area also had snowfall of 2 to 5 inches.

INDIANA

Statewide

01-

3 33 7 ? Flooding

A continuation of the flooding from the latter part of December 1990 was evident during the first week of January. A short synopsis of the flood event follows, with more detailed information in the December 1990 Storm Report.

A classic major flood-event played out in much of the Indianapolis Hydrologic Service Area during the end of December 1990, and the first week of January 1991. The Corps of Engineers estimated flood damage ranged from \$50 to \$100 million. There were more than 2,000 homes and at least 4,000 people evacuated. A total of at least 4,000 homes and more than 10,000 people were touched by various aspects associated with the flooding. Seventy-two of 92 Indiana counties were declared disaster areas as a result of the flooding.

Information on the deaths due to flooding was provided by emergency preparedness officials. While the flood event began at the end of December, the deaths occurred in January. A 56-year-old male drowned on January 1st in Pulaski County after abandoning his automobile. In Grant County, a 43-year-old female died when her automobile was surrounded by the flood waters of the Mississinewa River. She drove her vehicle around barricades that prohibited travel. The third victim was a 48-year-old male whose boat capsized while trying to remove valuables from a house surrounded by floodwaters in Greene County. His body was never recovered. (M560, F43V, M84O).

Since almost all of Indiana's flood plains are flat, the bitterly-cold temperatures from December 31, 1990 to January 4, 1991 contributed greatly to the flood disaster and misery. The cold temperatures froze the floodwaters and left ice several inches thick in homes and on roads. Those homes which were evacuated and had their heat turned off had frozen water pipes. Ice was so treacherous that some residents could not return to their homes.

The most severely affected areas were Marion, Howard, and Hamilton counties. Nearly 1,000 homes had first floor flooding; at least another 1,000 were affected or threatened by possible levee failures. Flooded areas in these counties included Ravenswood, Riverwood, Trails End, Noblesville, southwestern Indianapolis, and Kokomo. Evacuations in these areas probably exceeded 1,000 people.

JANUARY 1991

		TIME			NO. PER	OF SONS	ESTII DAM/	AATED AGE	
PLACE	Đ	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-C-ED			NTORO	CHARACTER OF Storm

INDIANA Cont'd

Daviess County

02 1505EST

? ? 0

Flash Flood

Flooding along the White River caused a failure in the Elnora levee. The break in the levee affected about 10 homes.

Vanderburgh County 06 0930EST Evansville

Flood

?

An inch and a half of rain over a 24-hour period added to flooding along Pigeon Creek on the northern side of Evansville. The creek, unable to drain properly with the Ohio River reaching a crest of 44.6 feet, backed up and flooded parts of the city between 1st Avenue and Stringtown Road. Several families were forced to evacuate their homes.

St. Joseph, LaPorte Counties

20 0000EST-21 2300EST

0

Heavy Snow

Strong northern winds and bitterly cold temperatures produced lake-effect snow over LaPorte and northwestern St. Joseph counties in north-central Indiana. Snow depths were generally 8 to 12 inches with a maximum snow depth of 20 inches reported at the Toll Road Exit at Michigan City, Indiana. Other snow depths were 13 inches at Westville and 10 inches at LaPorte.

IOWA

IAZ004-005-006-007-008-009-010-011-015 NEZ010-ILZ004 Most of Iowa

2100CST-05 1200CST

Snow and Heavy Snow

Snow began over the southwestern part of Iowa during the evening hours of the 4th, and developed quickly over the rest of the state. Snowfall was generally in the 5- to 8-inch range in a band extending from southwestern and west-central Iowa, through central, east-central, into southeastern Iowa. The greatest amounts were at Audubon and Little Sioux, with each reporting 8 inches. Over the remainder of the state, snowfall amounts were in the 2- to 4-inch range. There was some freezing precipitation over the southern two tiers of Iowa counties; however, it was quite light and did not cause any really significant problems.

IAZ012-013-NEZ010 24 2200CS1-

0 3

Snow and Heavy Snow

A low-pressure system dropped out of Canada into the central United States. The system was a typical "Alberta Clipper," depositing a narrow band of heavy snows. Most of the snow fell over the southwestern and extreme south-central counties of Iowa. Amounts were generally in the 4- to 8-inch range. Heaviest snowfall was over the extreme southwestern corner of the state, with 13 inches recorded just across the border at Nebraska City. Lesser amounts fell over west-central, through central, into southeastern Iowa; in those areas, 1 to 3 inches was recorded. The snow presented little problem as it was of the light and fluffy variety.

KANSAS

KSZ017 Southeastern Corner of Kansas 04 0400CST

0

0 Ice Storm

Labette, Cherokee, Neosho, and Crawford counties had several hours of freezing rain and freezing drizzle producing a 1-inch-thick layer of ice on roads. Schools were closed on January 4th with freezing rain ending by 1600 CST.

KSZ009-012-017 Southeastern Kansas

09 0900CST

O Ice Storm

A winter storm produced a 1- to 2-inch layer of ice over southeastern Kansas. Freezing rain began around 0900 CST and continued through 1900 CST on the 10th. Ice-covered roads closed schools on the 9th and again on the 12th.

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	<u> </u>		TIME		<u> </u>	NO.	OF SONS	EST II	MATED AGE		JANUARY 1991	
	PLACE	O E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K	- Name of the second		ORODO	CHÁRACTER OF STÓRM		
	KANSAS Cont'd								_			
	KSZ013-015	25	0800CST			0	0	0	0	Heavy Snow		
	Northeastern Kansas	Snow began falling over northeastern Kansas around 0800 CST and ended around 1600 CST. Snowfall of 6 to 11 inches occurred with the higher amounts near the Kansas/Nebraska border.										
]	KENTUCKY											
]	Boyd County	01	0700EST			0	0	4	4	Flood		
	Mason County Lefferson County	Heavy rain, which fell during the last part of December, forced the Ohio River from Ashland to Louisville to rise into flood on the 1st of January. The river remained above flood until the 7th of the month.										
ļ	Daviess County	01	0000CST			0	0	3	4	Flood		
]	Livingston County McCracken County	The lower Ohio River remained in flood from heavy rains during the month of December. The lower Ohio stayed in flood until the middle of the month.										
]	Butler County	08	0700CST			0	0	. 3	3	Flood		
		Hea floo	avy rain whod. The riv	ich fell ov er rose to	er central 34.5 feet,	Kentu whicl	icky f h is 1	orced .5 feet	the Gr above	een River at Wood the flood stage of	bury to rise into 33 feet.	
]	Nelson County	08	0700EST			0	0	3	3	Flood		
		Heavy rain falling on already-saturated ground, forced the Rolling Fork River at Boston to floo The river rose to 36.5 feet; flood stage is 35 feet.							Boston to flood.			
]	LOUISIANA											
	AZ010-013 Southeastern Louisiana	06	1000CST- 1800CST			0	0	0	0	Heavy Rain		
,	Amadia	Heavy rain fell across the Greater New Orleans area, including Slidell, during the late morning and afternoon. Rainfall totals of 2.50 to 4.50 inches were common during the period, with street flooding reported in many areas.										
-												

Iberia Parish Delcambre

10 0625CST

3 0 0 Thunderstorm Wind

A severe thunderstorm moved onshore Iberia Parish near Delcambre, where wind gusts tore the roof from a barn.

LAZ001-002-005-006-007-008-011-

012

Northwestern, and Southwestern

10 0000CST-11 1800CST

0 0 0 0 Heavy Rain

Three to 6 inches of rain fell over much of the state south and west of a Shreveport-Alexandria-Morgan City line. Saturated soil conditions produced considerable runoff, and street flooding was reported in many communities with a few rural roadways closed. Several rural schools were closed or dismissed early due to street flooding and weather conditions.

Assumption and Northern Terrebone **Parishes**

0600CST-2400CST

0 0 0 Flooding

High water stages on the Atchafalaya River created backwater flooding on several bayous in Assumption and northern Terrebonne Parish. A local flood protection levee collapsed near Bayou L'Ourse creating additional flooding. About a dozen homes were flooded in Assumption Parish, and another dozen homes were flooded near Gibson in Terrebonne Parish. Several roadways in the two parishes were also flooded.

JANUARY 1991

		TIME		,	NO.	OF SONS	EST II	MATED		JANUA
PLACE	DASTE	LOCAL	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K L L E O		A-28m 0020 A	CROPS	CHARACTER OF STORM	

LOUISIANA Cont'd

Cameron Parish Hackberry

15 0115CST

2 4

0 Thunderstorm Winds

A severe thunderstorm produced damaging wind gusts as it moved onshore near Hackberry. One mobile home was destroyed with two of the occupants suffering minor injuries. Four other mobile homes were damaged.

Iberia Parish New Iberia

15 0300CST

0 3

0 Thunderstorm Winds

Large tree limbs were ripped from several trees as a severe thunderstorm moved across New Iberia.

Jefferson Parish Kenner

29 0630CST

0.30

200 0

0 5

0 Tornado (F1)

A tornado touched down in a warehouse area just to the north of New Orleans International Airport (MSY). Approximately 50 businesses suffered damage, mainly to roofs; however, the tornado winds collapsed the walls of several buildings constructed of cinder block.

2

4

St. Charles Parish Destrahan

29 0840CST

0 0

0 Thunderstorm Wind

Thunderstorm wind gusts downed several trees in the Destrahan area.

LAZ006-009 East-Central

10 1200CST-31 2400CST

0 0

) Flooding

The Mississippi River reached flood stage from Natchez, MS to Donaldsonville during the month, though it remained well within the levee system. The river stages were unusually high for the month of January. The high-water levels created backwater flooding along the Red and Black Rivers and other tributaries. Agricultural land within the levee system was inundated, and several automobile ferries across the Mississippi River were closed due to high water flooded landings.

MAINE

MEZ003-004-007 008-010-011-013 014

Coastal Area

09 Evening 09 Night

0 0 ?

Freezing Rain

0

This weather event was caused by an ocean low-pressure system which moved from off the coast of North Carolina, on the morning of January 9th, to a position southeast of Nova Scotia by the morning of January 10th. Numerous automobile accidents resulted from ice on the roads.

MEZ001-002-003 004-005-006-007 008-009-010-011 012-013-014 Statewide

11 Evening 12 Evening

00?

0 Heavy Snow

A low-pressure system moving northeast from the middle Mississippi Valley started spreading snow into New England late in the day of the 11th. As this low continued moving northeast, a secondary low developed over the Delmarva Peninsula. Intensification of the secondary low occurred as it moved across New Jersey, Cape Cod, and eventually to western Nova Scotia by the evening of the 12th. Snow produced by this pattern ranged from 6 inches over northern Maine to 21 inches over the mountains. As a result of this weather, there were numerous automobile accidents with some fatalities, school closures, and business cancellations.

PLACE

TIME

LOCAL
STANDARD
PATH
(MILES)

VOC. OF ESTIMATED
PERSONS
DAMAGE

PERSONS
CHARACTER
STORM
STORM

OF PERSONS

OF ESTIMATED
PATH
I D O OF PERSONS
CHARACTER
STORM

MAINE Cont'd

MEZ005 Northwestern	16 Afternoon Evening	0	0	?	0	Heavy Snow
	On the morning of the 16th, a low across the eastern Great Lakes, ar Canadian Maritimes by the mornin River Valley, approximately 5 to 6 section of Maine.	pressund sub- ng of the inches	re sys sequen he 17th s of sn	tem ov tly do h. As low wa	ver the own the this lo as depo	Ohio River Valley moved northeast e St. Lawrence River Valley to the ow moved through the St. Lawrence exited over the extreme northwestern
MEZ002-003 005-006-007	30 Afternoon- 31 Morning	0	0	?	0	Heavy Snow
Eastern-Central MEZ004-008 011-014 Coastal Area	30 Afternoon- 31 Morning	0	0	?	0	Freezing Rain

On the morning of January 30th, a slow-moving cold front extended along the entire length of the eastern United States. One of the several waves on this front developed into a closed low-pressure system and moved from southwestern Kentucky across the Gulf of Maine to Nova Scotia by the morning of the 31st. Close to 9 inches of snow fell across east-central Maine, as rain and freezing rain occurred along the coast. This resulted in numerous automobile accidents, many school closures, and several cancellations.

MARYLAND and D.C.

MINICI LIMINO MI	d D.C.					
MDZ005-009	07 0200EST- 1900EST	0	0	0	0	Heavy Snow
	Several inches of snow fell across w 8 to 10 inches in Garrett County, Cumberland, and 4 to 5 inches acr	esteri 7 inc oss n	n and c ches at orthern	entral West Mont	Maryla minste Igomer	and. Representative totals included: r, 6 inches at Parkton, 5 inches at y County.
MDZ005-009	08 1800EST- 09 0600EST	0	0	5	0	Ice Storm
	Light freezing rain and freezing dr multi-vehicle crashes, on glazed ro lost their lives in weather-related accidents. Tree damage and down	crash	es. and	d at le	ast tw	traffic accidents, including several western Maryland. Two motorists o others were injured in the same n many power outages.
MDZ007-009	11 0000EST- 1200EST	0	0	0	0	Heavy Snow

Four to 6 inches of snow fell across western Maryland.

MASSACHUSETTS

MAZ001-002-004- 11 1800EST- 005-006-007-008 12 0800EST 0 0 0 0 Heavy Snow

The first generally-heavy snowstorm of the season deposited between 5 and 9 inches across the state, except Cape Cod and the Islands where 2 to 4 inches fell before a change to rain. The greatest accumulations were confined to the northeastern portion of the state including Middlesex and Essex counties; Woburn reported 11 inches, Reading 10, and Newburyport 9 inches. Boston had 8.5 inches, Worcester had 7 and Springfield 5.5 inches. Snow mixed with and changed to rain, before ending over portions of eastern Massachusetts during the morning of the 12th. Sharply-falling temperatures to the lower 20s during forenoon, quickly turned the slush to ice, complicating snow removal operations. There were numerous reports of skidding accidents and many events were canceled. The fact that the storm occurred on a weekend facilitated snow removal and prevented school and business cancellations.

	_	TIME			NO.	OF SONS	EST IN	ATED		JANUARY 1991
PLACE	Đ	LOCAL Standard	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K I L L L L L L L L L L L L L L L L L L	Omocc.21		OBOD W	CHARACTER OF STORM	

MASSACHUSETTS Cont'd

MAZ003 Cape Cod 0000EST-1200EST

Heavy Snow

Northern winds transported Arctic air across Cape Cod Bay, and resulted in "lake-effect" snow with a stationary band dumping 6 to 10 inches in a narrow north-to-south swath from Sandwich to Mashpee. The heaviest amount of around 10 inches fell in Sandwich, with 6 inches reported from Marstons Mills. Lesser amounts were reported from other parts of the Cape; roads were plowed and schools closed. Hyannis Airport was closed between 0600 EST and noon for plowing operations.

MICHIGAN

Ottawa County Grand River

0000EST-0800EST

Flooding

Ice jams, between Grand Haven and Spring Lake, which began in December 1990, continued to cause flooding upstream of the ice jam until the 9th of January. By then, the ice jam had broken up enough to allow the river level to fall below flood stage. This flood event caused some inconvenience with very little damage. Many residents near the river had to park a block or two from their homes, but could still use them. The flooding occurred mainly to parks along the river banks and nearby streets.

Lenawee County Raisin River

0000EST-03 0800EST

0 0 **Flooding**

The flooding on the Raisin River which began from heavy rain during December 1990, continued until the 3rd. The river crested on December 31st; the level continued to fall after that, falling below the flood stage of 9 feet at Tecumseh and 11 feet at Adrian on the 3rd. The damage which occurred to roads and bridges during December when the flooding first began, was to a large degree repaired by the middle of January. large degree repaired by the middle of January.

Berrien County St. Joseph River

0000EST-0800EST 05

0 0 Flooding

The St. Joseph River fell below the flood stage of 11 feet at Niles on the 5th. Flooding occurred due to the heavy rain in late December. The river crested at Niles on December 31st; 3 feet above flood stage. No further damage was reported to property in January.

St. Joseph County St. Joseph River

0000EST-0800EST

O 0 0 0 Flooding

The St. Joseph River fell below flood stage of 6 feet at Three Rivers on the 11th; the flooding was caused by heavy rains in late December 1990. The river crested at Three Rivers on the 3rd, 1.9 feet above its flood stage of 6 feet. No additional damage was reported to property in January.

Kent County Ottawa County Grand River

04 0800EST-0800EST

0 O Flooding

On January 4th ice jams developed further upstream, between the city of Grand Rapids and the M45 State Highway Bridge; this was upstream of the flooding already occurring from near Grand Haven. Little significant damage was reported from this event; mostly trees and grass areas were under water near the river bank.

JANUARY 1991

		TIME			NO. PER	OF SONS	ESTI!	MATED GE	
PLACE	DAO	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-LLED K-LLED	- AND CAR	~-cama0:20:0	WTQ20C	CHARACTER OF STORM

MICHIGAN Cont'd

MTZ043-046-050-052-054-068 Northern Lower Peninsula

05 0700EST-1700EST

0 0 Heavy Snow

Snow began falling over southwestern-lower Michigan during the midmorning hours of Saturday, then spread across most of lower Michigan by 0900 EST. The snow became moderate to heavy over a 50-mile-wide area of north-central lower Michigan by 1000 EST. The heavy snow continued across this area until midafternoon (about 1530 EST). The snow ended across Michigan by 1700 EST. All of lower Michigan had at least 1 inch of snow from this storm. Most of the counties (80%) had 2 to 5 inches; however, a 50-mile-wide area which extended east-to-west from near Manistee, and north to near Traverse City had 6 to 10 inches of snow. The heaviest snowfall was in southeastern Kalkaska County. Little wind was reported with this storm, but several dozen traffic accidents were reported. Four people died in three separate crashes. A mother and her daughter were killed in a head-on collision in Tuscola County in the Thumb area during the late morning. A woman died when her car slammed into a jackknifed tractor-semitrailer in Hillsdale County around 1100 EST. During the midafternoon (1530 EST), a man died near the city of Lansing in yet another crash. It is worth noting that none of these accidents were in the heavy snow area. accidents were in the heavy snow area.

MIZ003-006-010-013-014-017-023-026-029-031-034-036-053-058-063-068 12

2200EST-0500EST

0 0 Heavy Snow

Most of the Lower Peninsula

Snow began falling over southwestern-lower Michigan during late-evening hours of Thursday, January 10th, then spread northeast across all of lower Michigan by 0700 EST Friday morning. Heavy snow fell over most of this area from 1300 EST until about midnight on the 11th. Winds were northeast around 10 to 20 mph with some gusts to around 25 mph. This caused drifts to near 2 feet in many areas; the snow ended as flurries early Saturday morning. The snow turned to freezing rain over the southeastern sections of lower Michigan during the early-morning hours on Friday. The freezing rain continued intermittently until late-afternoon. Heavy snow fell north of a line that extended from 50 miles north of the city of Detroit, west to the Allegan/Van Buren of a line that extended from 50 miles north of the city of Detroit, west to the Allegan/Van Buren County line; in that area, 6 to 10 inches of snow was common. A 50-mile-wide area that extended from just northeast of Grand Rapids to Oscoda had 10 to 12 inches generally; however, central Iosco County reported the heaviest snowfall from the storm, with 14 inches in that area. There was a secondary maximum snowfall area over the northwestern sections of the Michigan Thurmh areas there 2 to 10 inches of grand was a secondary maximum snowfall area. Thumb area; there, 8 to 10 inches of snow was common. Like the storm on January 5th, dozens of automobile accidents were reported. Four people welled in three separate accidents; again, three women and one man died. Several multiple-vehicle accidents occurred. Schools were closed across the Thumb area and most of central-lower Michigan. The freezing rain was light, but was a factor in most of the accidents.

MIZ001-072-073-075-076-078 Southwestern Lower Peninsula and the Northern Upper Peninsula

20 0100EST-21 0500EST

0 0 0 Heavy Snow

Lake-effect heavy snow occurred over the Lake Superior shore counties of the Michigan upper peninsula, and Berrien County of extreme southwestern-lower Michigan. Over the upper peninsula, the snowfalls in the lake-effect areas ranged from 5 to 10 inches. The heaviest reported snowfall was over southwestern Alger County where 10 inches fell. Most other sections had 6 to 8 inches of snow. Over Berrien County, in southwestern-lower Michigan, 6 to 8 inches was common. About 12 inches was reported over the south-central part of the county between Tree Oaks and Galien.

MIZ005-006-047-051-061-063-069-070-072-075-078 Northwestern Lower

0000EST-1200EST

0 0 n n Heavy Snow

Peninsula and the Northern Upper Peninsula

Lake-effect heavy snow occurred over the Lake Superior shore counties of the Michigan upper peninsula, and most of northwestern-lower Michigan on the 22nd through 24th. Only over Alger

JANUARY 1991

		TIME			NO.	OF SONS	EST!!	ATED	
PLACE	DAO-E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K	I N J U RELO	A-000m00-A	WTC DOC	CHARACTER OF STORM

MICHIGAN Cont'd

County of the northern-central upper peninsula, and over the Keweenaw did significant snowfall occur until about noon on the 26th. This event occurred with strong northwestern winds, frequently 15 to 25 mph; some areas reported wind gusts to near 50 mph. These strong winds occurred with temperatures from 5 to 15°F over the lower peninsula and -10° to 15°F over the upper peninsula. Wind chills were frequently -10 to -20°F and occasionally near -30°F. Many areas reported near-blizzard conditions frequently on the 22nd and 23rd. With this, snowfalls of 6 to 12 inches were common over northwestern lower Michigan and 8 to 16 inches over the upper peninsula. The maximum snowfalls were over Chippewa County near Whitefish Point; this is where 16 inches was reported to have fallen. Even with all of these conditions, no reports of serious accidents to people or property were received; only the typical fender benders were reported. reported.

MINNESOTA

MNZ01	1-012-014-
	Eastern-
Central	Minnesota

27 1300CST-28 0500CST 0

A narrow band of heavy snow (about 20-miles wide), fell across central into eastern-central sections from early afternoon on the 27th through the early morning on the 28th. Six inches was reported at Milaca, 6.5 inches at Little Falls, and 7.5 inches near Pine City.

MISSISSIPPI

Harrison County

2100CST-0400CST

0 6 Flash Flooding

Heavy Snow

Up to 10 inches of rain fell over Harrison County during an 11-hour period from 1800 CST on the 6th to 0500 CST on the 7th. The heavy rainfall caused widespread flash flooding throughout the county. More than 300 people were forced from their homes by floodwater; a total of 257 homes and 20 businesses received water damage. The flooding also caused between \$200,000 and \$250,000 damage to county roads and bridges. Harrison County was declared for Federal Disaster Assistance. Disaster Assistance.

Warren County

5 0 Flooding

Flooding along the Mississippi River prompted the evacuation of 40 families due to flooded access roads. Eight to ten homes in the Long Lake and Ford Subdivisions in Vicksburg received flood damage. Several hunting and fishing camps located in low-lying areas in northern Warren County were also damaged by high water.

Jasper County 2 SE Stringer

30 0205CST

0 Thunderstorm Wind

Straight-line thunderstorm winds destroyed a house trailer and a shed. Seven to eight trees were blown down; one on a utility shed and two houses received minor shingle damage. Small hail covered the ground.

Harrison County 2 N Biloxi

30 0409CST

O O O Hail (1.00)

Jackson County 7 N Ocean Springs 30 0415CST

0 0 0 Hail (0.75)

MISSOURI

None reported.

JANUARY 1991 ESTIMATED DAMAGE NO OF PERSONS TIME LENGTH OF PATH WIDTH OF PATH LOCAL DA PROPER CHARACTER OF STORM STANDARD PLACE Ē (MILES) (YARDS) MONTANA MTZ001-003-004-1200MST-006-009 02 0500MST 0 0 0 0 Heavy Snow Three to 10 inches of snow fell across the area; East Glacier reported 17 inches. MTZ001-004 0600MST-0500MST 0 Heavy Snow Four to 10 inches of snow fell. MTZ003-007 1200MST-1700MST 0 0 High Wind (G71) Livingston reported a peak wind of 82 mph and Cut Bank 67 mph. MTZ001-007 19 0200MST-1000MST Heavy Snow Three to 5 inches of snow fell in the early morning. **MTZ007** 2200MST-1000MST Heavy Snow Three to 5 inches of snow fell across southern-central Montana with more than a foot at the ski area near Red Lodge. MTZ003 1300MST-1500MST 0 0 3 0 **High Wind** A truck was blown over near Conrad. 30 1250MST-31 2200MST MTZ003-007 0 0 0 0 High Wind (G60) **NEBRASKA** East-Central 2100CST-0600CST ? ? Nebraska 0 Heavy Snow NEZ010 Six inches of snow fell overnight in extreme eastern Nebraska. Ten inches was reported at Blair in Washington County. Southeastern 10 1500CST-Nebraska ? 2400CST 0 ? 0 Heavy Snow NEZ015-019 Six to 8 inches of snow fell south of Lincoln. Eastern Nebraska 24 2000CST-NEZ004-009-101-

NEVADA

015-019-020

None reported.

25 1200CST

?

0

?

Six to 8 inches of snow fell over eastern Nebraska. Nebraska City received a total of 12 inches.

0

Heavy Snow

JANUARY 1991

		TIME			NO. PER	OF SONS	EST!!	AGE	
PLACE	DAO-E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)) L	OMMCC Z	4-8mm 402a 4	CECODA	CHARACTER OF STORM

			(MILES)	(TARDS)	ð	Ď	R Y		
NEW HAMPSHI	RE								
NHZ006-007 Coastal	09	Evening- Night			0	0	?	0	Freezing Rain
	Car	olina on the	e morning	of January	' 9th.	to a 1	positio	n sout	moved from off the coast of North heast of Nova Scotia by the morning ents as a result of ice on the roads.
Coos County	10				0	0	?	0	Flash Flood
Northwestern	Min pac	nor flooding k in the Isr	g of roadw ael River.	ays and lo	w spo	ots in	the La	ancaste	er area was caused by an elevated ice
NHZ001-002-003 004-005-006-007 Statewide	11 12	Evening- Evening			0	0	?	0	Heavy Snow
Siziewice	sno sec occ the	w into New ondary low urred as it evening of tion of the	England developed moved acretical the 12th. state to 21	late in the last over the loss New Jo Snow pro- inches over	day of Delnersey duced or the	of the narva, Cap to the control of	11th. Pening e Cod, his pat ntains	As thisula. and ettern rain nor	Mississippi Valley started spreading is low continued moving northeast, a Intensification of the secondary low eventually to western Nova Scotia by anged from 6 inches over the eastern thern sections. The highest amounts the mountains.
MII 7001 000	20	A &							

NHZ001-002 Afternoon-? 31 0 0 0 Heavy Snow Northern NH Morning Afternoon-Morning NHZ 005-006 30 ? 0 Freezing Rain

On the morning of January 30th, a slow-moving cold front extended along the entire length of the eastern United States. One of the several waves on this front developed into a closed low, and moved from southwestern Kentucky across the Gulf of Maine to Nova Scotia, by the morning of the 31st. Six to 7 inches of snow fell across northern portions of the state, as rain and freezing rain fell over southern sections. This resulted in numerous automobile accidents, many school closures, and several cancellations.

NEW JERSEY, Northern

NJZ001-015 Northwestern and Metropolitan New Jersey

11 2000EST

Heavy Snow 0 0 0

An elongated area of low pressure extending from the Ohio Valley to the mid-Atlantic Coast worked in concert with a high-pressure system off the New England coast, to produce a significant snowfall across the area. Snow began to fall during the early-morning hours and continued until around midnight. At about this time the arrival of warmer air began to change the snow over to rain, with a brief period of sleet and freezing rain in between. Snowfall amounts ranged for the most part between 4 to 6 inches. Harrison, Newton, and Charlottenburg reported 6 inches of snow as well as Newark Airport.

NEW JERSEY, Southern

NJZ00S Southern New Jersey 07 1300EST

0 0 3 0 Heavy Snow

Rain changed to snow between 0500 and 0600 EST and continued until around 1700 EST. By 1300 EST 4 inches of snow had accumulated over much of southern New Jersey. Final accumulations ranged from 2 to 5 inches.

JANUARY 1991

	TI	TIME			NO.	OF SONS	EST II	AGE		JANUART
PLACE	Đ	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	KILLI	Cm2CC-Z-		COCODO	CHARACTER OF STORM	

NEW JERSEY, Southern Cont'd

NJZ002-004 Gloucester, Camden, Burlington, Mercer and Portions of Ocean and Atlantic

Counties

09 0700EST 0 0 4 0 Snow Freezing Rain

Snow began falling from 1800 to 2000 EST on the 8th. One to 2 inches accumulated before changing to freezing rain and sleet, which continued until 0500 to 0700 EST on the 9th before changing to rain. The freezing rain caused icing which brought down trees, tree limbs, and utility lines. The icy roadways resulted in numerous automobile accidents.

NJZ002-004 Gloucester, Camden, Burlington, Mercer and Portions of Ocean and Atlantic Counties

11 1600EST 0 0 3 0 Snow Freezing Rain

Snow began around 0900 EST and continued until 1400 to 1500 EST before changing to sleet and freezing rain; snow accumulations were 2 to 4 inches. The freezing rain and sleet continued until 1900 to 2100 EST before changing to all rain. The freezing rain caused some downed utility lines and tree limbs. The snow and ice caused hazardous road conditions and many traffic accidents. The snow and ice was followed by heavy overnight rain.

NJZ002-004 Camden, Burlington, Gloucester, Mercer and Portions of Ocean and Atlantic Counties

12 0100EST 0 0 3 0 Flooding

One to 2 inches of heavy rain fell on top of snow and ice accumulated from sleet and freezing rain. This heavy rain resulted in urban and small stream flooding. The Assunpink Creek in Mercer County flooded from 0300 to 1200 EST and the crest was at 8.55 feet where flood stage is 7.00 feet.

NEW MEXICO

NMZ002-006 Rio Arriba County Taos County McKinley County 03 2000MST-04 2200MST

0 0 0 0 Heavy Snow

Heavy snow occurred primarily over the north-central mountains at elevations above 8,000 feet. Snowfall in inches by county included: Rio Arriba 2 to 6 inches, Taos County above 8,000 feet, 7 to 14 inches, and western McKinley County above 8,000 feet, around 7 inches.

NMZ005-009-012 San Miguel County Quay County Guadalupe County Lincoln County Otero County

09 1000MST-10 1400MST 0 0 0 Heavy Snow

Heavy snow occurred mainly over the eastern-central plains and the southern-central mountains. Snowfall in inches by county included: eastern San Miguel County 4 to 8 inches, Quay County, 4 to 5 inches, Guadalupe, 4 to 6 inches, southern Lincoln, 2 to 6 inches, and northern Otero County 5 inches.

NMZ006-010 McKinley County Grant County Sierra County 16 0100MST-18 1100MST 0 0 0 Heavy Snow

This particular storm produced heavy snow in western McKinley County (7 inches) early on the 16th, as it moved slowly south through eastern Arizona. It then caused heavy snow over parts of the southwestern mountains (in eastern Grant and southwestern Sierra counties), where 8 to 12 inches fell over the higher elevations, mainly on the 17th and early on the 18th.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST IN	MATED AGE		JANU
PLACE	D A E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	Kiring	CHIZCLE.	4-00mm0020-4	CECOEN	CHARACTER OF STORM	

NEW MEXICO Cont'd

NMZ001-002-006-008

McKinley County Rio Arriba County San Miguel County San Juan County 20 2000MST-21 1100MST

0 0 0 0 Heavy Snow

Snow fell over most of the state from this storm except the northeastern and east-central plains. Although amounts were generally in the 1- to 3-inch range, heavy snow did fall over the following counties: McKinley, 2 to 9 inches, Rio Arriba, 3 to 5 inches, San Juan, 2 to 5 inches, and western San Miguel, 3 to 4 inches. Ski areas over the central-mountain chain received from 4 to 10 inches of snow.

NEW YORK, Central

Area-Wide

05 PM-06 AM

0 6 5 0 Freezing Rain

Freezing rain created slick road surfaces. Local police agencies reported a rash of car accidents. In the city of Schenectady (Schenectady County), one male was injured when he was hit by a car; the driver of the car was unable to see the walker due to a very intense squall.

Area-Wide

11 1100EST-12 0700EST

0 7 3 0 Snow

Seven to 12 inches of snow covered all of eastern New York. Near the end of the storm, warm air worked its way into New York and changed the precipitation over to sleet for a brief period. For most communities this was the biggest snowfall since 1987.

Area-Wide

16 0500EST-1000EST

2 22 6 0 Freezing Rain

Rain fell across eastern New York; ground temperatures were still below freezing, so the rain quickly turned to ice. (M56V, M80V)

NEW YORK, Coastal

NYZ014 Rockland and Westchester County 11 2000EST

0 0 0 0 Heavy Snow

An elongated area of low pressure extending from the Ohio Valley to the mid-Atlantic Coast worked in concert with a high-pressure system off the New England coast, to produce a significant snowfall across the area. Snow began to fall during the early-morning hours and continued to around midnight. At about this time the arrival of warmer air began to change the snow over to rain, with a brief period of sleet and freezing rain in between. Snowfall amounts ranged for the most part between 4 to 6 inches.

NEW YORK, Western

NYZ022	11	1400EST	0	0	4	0	Heavy Snow/Ice
NYZ001-021	11	1500EST	Ó	0	5	Ō	Heavy Snow/Ice
NYZ002	11	1600EST	0	0	4	0	Heavy Snow/Ice
NYZ003-005	11	1700EST	0	0	5	0	Heavy Snow
NYZ004	11	1800EST	0	0	4	0	Heavy Snow

Low pressure tracked north from Kentucky and spread heavy snow across the area with snowfall amounts ranging from 4 to 7 inches. The snow then combined with freezing rain over western portions during the afternoon and evening, and scattered power outages resulted from lines being downed by the weight of the ice. Police agencies throughout western and central New York reported slippery roads and numerous accidents caused by freezing rain and snow. The treacherous mixture of precipitation forced numerous schools to cancel classes. Some reported snowfalls included: Syracuse, Onondaga County, 7 inches; Watertown, Jefferson County, 6 inches; Ithaca, Tompkins County, 5 inches; Penn Yann, Yates County, 6 inches; Rochester, Monroe County, 5 inches; Little Genesee, Allegany, 6 inches.

JANUARY 1991 ESTIMATED DAMAGE NO. OF PERSONS TIME LENGTH OF PATH WIDTH OF PATH LOCAL CHARACTER STANDARD PLACE Ŭ SŤÖRM Ē (MILES) (YARDS) NEW YORK, Western Cont'd Heavy Snow Heavy Snow 0600EST ŏ NYZ022 0600EST Ó 0 Ō **NYZ001** 1300EST Heavy Snow 24 A westerly flow of Arctic air across the relatively-warm waters of Lakes Erie and Ontario produced lake-effect snow squalls. Snowfall reports included: Barnes Corners, Lewis County, 26 inches; Mayville, Chautauqua County, 15 inches; and Colden, Erie County, 8 inches. Heavy Snow Heavy Snow Heavy Snow **1YZ001** 31 1100EST Õ Ō **NYZ004** 1100EST 31 0 0 **NYZ005** 0 1100EST **NYZ022** Heavy Snow Strong western-to-northwestern winds combined with cold air, to produce intense bands of lake-effect snow off Lakes Erie and Ontario. Reported snowfall amounts included: Oswego, Oswego County, 18 inches; Mayville, Chautauqua County, 12 inches; and Hamburg, Eric County, 6 inches. NORTH CAROLINA 16 1140EST 0 0 Hail (0.75) Moore County Nickel-size hail was reported in Aberdeen in southern Moore County. NORTH DAKOTA 0900CST-NDZ007 Part of South-1500CST 0 0 0 High Winds Central Northwestern winds of 25 to 50 mph occurred in the city of Bismarck. A carpenter was killed after he fell 30 feet at a construction site. The man had momentarily climbed to the roof to tie down loose panels when the winds caused him to slip and fall. (M250) North Dakota ОНЮ

Washington County

Portsmouth

0700EST-

0600EST

0 0 5 Flood

The Ohio River at Portsmouth crested at 53.7 feet at 2000 EST on the 2nd. This was nearly 4 feet above flood stage.

OHZ009 South-Central 2100EST-

0500EST 07

O 0 Heavy Snow

Heavy snow moved into southern Ohio during the evening of the 6th. It was mixed with freezing rain and sleet which coated roads, trees, and power lines with ice. Snow depths reached 4 inches across extreme southern Ohio around 0400 EST on the 7th, with maximum depths of 5 inches near Pomeroy in Meigs County.

OHZ002-004 Central Lakeshore Northeastern Lakeshore Northeastern-

Inland

2000EST-2400EST

0 0 0 Heavy Snow

Heavy snow moved into northeastern Ohio during the evening of the 20th. The snow fell through the night reaching 6 inches in Chardon at 0700 EST, the Cleveland area at 1200 EST, and around Richfield at 2000 EST, all on the 21st. Total accumulations ranged from 3 to 10 inches across northeastern Ohio.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST II	AGE	
PLACE	Đ	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K		4- 00 m0030.4	COCCO	CHARACTER OF STORM

OHIO Cont'd

OHZ002-003 Central Lakeshore Northeastern Lakeshore 29 2200EST-30 0600EST

0 0 4 0 Heavy Snow

Heavy snow moved into northeastern Ohio just before midnight on the 29th. The snow fell through the night with accumulations reaching 6 inches in parts of northeastern Ohio at 0500 EST. Total accumulations were from 4 to 7 inches.

OHZ003 Northeastern Lakeshore 31 0900EST-1700EST

0 0 4 0 Heavy Lake-Effect Snow

Heavy lake-effect snow developed over extreme northeastern Ohio during the morning of the 31st, with accumulations reaching 6 inches by 1400 EST in Ashtabula. Total accumulations were 4 to 6 inches.

OKLAHOMA

OKZ001-020-026-033 03 2100CST-07 1500CST

0 0 ? 0 Ice Storm/Snow

Several rounds of ice and snow caused numerous traffic accidents over roads that were already icy from an ice storm in late December. On January 3rd freezing rain, freezing drizzle, and light snow fell across most of the state except the extreme southeastern portion. It continued through early morning on January 5th when the precipitation turned to rain except in the panhandle and northwestern area, where it turned to freezing rain. During the night of the 5th, spotty freezing precipitation was again observed on the 6th and 7th, with most of the freezing precipitation on the 7th reported across central and east-central Oklahoma. Mail service was temporarily halted in several towns.

OKZ006-010-029 East-Central Oklahoma/Tulsa

09 1200CST-10 0300CST

0 0 0 Freezing Rain

Freezing rain fell across north-central Oklahoma and was also reported in the city of Tulsa. Ponca City received 0.26 inch of ice in this storm. Numerous traffic accidents were reported and schools were closed in many communities.

OKZ019 3 W Waurika

24 2157CST

0 0 ? 0 Wind Damage

Strong winds associated with a cold front blew down the Waurika Sheriff's Department radio tower.

OREGON

ORZ004-007 All Eastern Oregon 06 0200PST-07 1500PST

2 ? 0 ? Ice Storm

Steady precipitation created problems over a large area of Oregon. Freezing rain in the Willamette Valley made all modes of transportation slow. One female was killed when her vehicle slid off an icy highway (Lane County). A second female was struck and killed after abandoning her own disabled vehicle on a highway (Lane County). Nearly an inch of ice accumulated in the Portland area. The higher terrain of eastern Oregon received 1 to 6 inches of new snow while Cascade Locks in the Columbia Gorge had 12 inches. (F35V, F?0)

ORZ001-010

11 1000PST-12 1000PST

3 2 ? 0 High Wind

A windy winter storm blasted the exposed northern coast and the strong winds were funneled down the Columbia Gorge to northeastern Oregon. Early in the storm period wind speeds were gusting 63 mph at Netrets, 57 mph at Seaside, and 52 mph at the mouth of the Columbia River (Clatsop County). In eastern Oregon, winds reached gusts of 53 mph in Tutuilla (Umatilla County). A 75-foot-long trawler sank northwest of Astoria (Clatsop County) at 1540 PST in

JANUARY 1991

		TIME			NO.	OF SONS	EST!	MATED AGE	
PLACE	D40-E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	C L	-Z-JORMO		משטטיו	CHARACTER OF STORM

OREGON Cont'd

very rough seas. A United States Coast Guardsman was on board the sinking ship with four fishermen when it submerged. Two fishermen were eventually rescued but two others and the coastguardsman drowned. The next morning wind was still reaching speeds of 65 mph at Youngs Bay Bridge (Clatsop County). (M280, M370, M?0)

ORZ001-002

11 1200PST-12 1000PST

Heavy Rain

Over 3 inches of rain fell in the coastal range east of Newport (Lincoln County). The Wilson River near Tillamook (Tillamook County) crested at flood stage on the 12th.

PENNSYLVANIA, Eastern

PAZ012 Southeastern Pennsylvania 07 1300EST

0 0 3

Heavy Snow

Rain changed to snow around 0500 EST and continued until around 1500 EST. The snow accumulations were 2 to 5 inches with the highest amounts in Philadelphia and the surrounding suburbs.

PAZ011-012 East-Central and Southeastern Pennsylvania

08 2300EST

0 0 4

0 Snow, Freezing Rain

Snow began falling from 2000 to 2200 EST on the 8th but changed to freezing rain within a few hours. Only 1 to 2 inches of snow accumulated, but the freezing rain continued until 0800 to 1000 EST on the 9th before changing to rain or ending. This long period of freezing rain or drizzle caused a thick coating of ice. Many ice-laden trees, tree limbs, and utility lines were downed. Fifteen thousand or more customers had power outages, with some for periods of 5 hours or more. The ice caused hazardous conditions on roadways and numerous traffic accidents occurred.

PAZOOE Eastern Pennsylvania 11 1600EST

0 0

Snow, Freezing Rain

Snow began falling from 0600 to 0900 EST but changed to sleet and freezing rain, or freezing drizzle, by 1300 to 1500 EST across the south, and by 1500 to 1700 EST across the north. Snow accumulations included: 2 to 7 inches over the upper Susquehanna Zone, 2 to 6 inches over the Poconos and northeastern Metropolitan Zones, 7 to 4 inches over the east-central and lower and middle Susquehanna Zones, and 1 to 3 inches over the Southeast Zones. The sleet and freezing rain, or freezing drizzle, finally changed to rain or drizzle at 1800 to 1900 EST over the Southeast Zone and 2200 to 2400 EST over the lower and middle Susquehanna Zones. Over the remaining zones the freezing rain or freezing drizzle continued, at least intermittently, until ending between 0500 to 0600 on the 12th. Although the ice on trees and utility lines caused some service outages, the main problem was created by the hazardous roadways. Many traffic accidents resulted, with one involving 20 vehicles on Interstate 81 in northern Lackawanna County.

PENNSYLVANIA, Western

Beaver County 12 NE Beaver

01 0000EST

0 0

Flood

Flooding on Connoquenessing Creek continued until 0400 EST.

Lawrence County 4 W New Castle

01 0430EST

0 0 0 Flood

0

?

In Union Township, a car carrying five occupants stalled on the Mahoning River Bridge which was under water from the flooding river. All tried to wade to the southern side of the bridge, but one girl was swept away; she was taken to the northern side after being rescued by another passenger. Both tried to wade back across the river but the girl was once again swept away and drowned. (F19C)

PLACE TIME LOCAL STANDARD PATH (MILES) PATH (YARDS) DOF DESTIMATED DAMAGE PERSONS PATH PATH L N R R R CHARACTER OF STORM OF PERSONS PATH L N R R R STORM	
PLACE T STANDARD PATH PATH (MILES) (YARDS) PLACE T STANDARD PATH (MILES) (YARDS) T STORM T STORM	
PENNSYLVANIA, Western Cont'd	
PAZ005 07 1500EST 0 0 0 Heavy Snow	
Laurel Mountains Glencoe, in Somerset County, reported 8 inches of snow.	
PA006 07 1500EST 0 0 0 Heavy Snow	
Southern-Central Mountains Six to 7 inches of snow fell in Bedford County.	
PA013 07 1500EST 0 0 0 Heavy Snow	
Southern-Central In Fulton County, six inches of snow fell in Town Hill.	
PAZ005 11 0740EST 0 0 0 Heavy Snow	
Laurel Mountains Six inches of snow accumulated in Somerset County.	
PAZ006 11 0850EST 0 0 0 Heavy Snow	
Southern-Central Mountains Six inches of snow accumulated in Bedford County.	
PAZ005 11 0945EST 0 0 0 Heavy Snow	
Laurel Mountsins Six inches of snow accumulated in Cambria County and 8 inches in southern Som	erset County.
PAZ013 11 0955EST 0 0 0 Heavy Snow	,
Southern-Central Mountains Six to 8 inches of snow fell in Fulton County.	
Westmoreland	
County Latrobe 11 1235EST 0 0 0 High Wind	
Trees were downed in Latrobe by non-convective high wind.	
PAZ002 21 1403EST 0 0 0 Heavy Snow Northwestern	
Southern Erie County received 8 inches of snow overnight.	
PAZ005 21 1530EST 0 0 0 Heavy Snow	
Laurel Mountains Five to 10 inches of snowfall was reported. Somerset County at Jennerstown had Laurel Mountain in Westmoreland County had 8 inches.	19 inches and
PAZ014 21 1530EST 0 0 0 Heavy Snow	
Northern-Central Mountains Five to 10 inches of snow fell in this zone.	
PAZ005 31 0930EST 0 0 0 0 High Wind	
Laurel Mountains Somerset reported gusts to 63 mph.	
Laurel Mountains Somerset reported gusts to 63 mph. RHODE ISLAND	
Somerset reported gusts to 63 mph.	

Snow accumulated from 4 to 7 inches over the northern portion of the state resulting in numerous (mostly minor) skidding accidents. Snow changed to rain before ending in some areas. A sharp drop in temperature caused a quick freeze-up of wet snow and slush during forenoon, which created problems for snow removal.

NO. OF PERSONS ESTIMATED DAMAGE TIME LENGTH OF PATH WIDTH OF PATH LOCAL CHARACTER ACO HIGO-A **PLACE** STANDARD STORM Ē (MILES) (YARDS)

JANUARY 1991 SOUTH CAROLINA SCZ001-002 16 Unknown 0 0 Cold Exposure Mountains and **Foothills** A 66-year-old Greenville County man died of exposure. (M66?) **SCZ006** 24 Unknown Hypothermia Southern Midlands A 70-year-old Richland County man died of hypothermia. (M70?) SCZ001-002-003 0700EST-1200EST Mountains, Heavy Snow Foothills, Eastern Piedmont A marginal winter storm produced up to 6 inches of snow in the mountains of South Carolina. Snow also fell at a rapid rate across the foothills, piedmont, and midlands. Accumulations ranged from a trace to about 4 inches in those areas due to soil and pavement temperatures. The snow disrupted travel, business, and government activities during the afternoon and early-evening hours. SOUTH DAKOTA Lincoln County I-29 Near 15 0545CST ? 2 0 Dense Fog Worthing Dense fog over southeastern South Dakota caused a six-car pileup. The first car involved in the accident overturned on a slick road, then five other cars smashed into each other trying to avoid the first car. Two middle-aged women were hospitalized with injuries. Perkins County 22 1400CST 5 South of Bison High Winds (G69) High winds raked across most of western South Dakota flipping a tractor-semitrailer near Bison. The driver was not injured, however, the truck was damaged. Pennington County Just South of 28 1455CST 2 ? Snow-Packed Road 0 Rapid City A young woman lost control of her car on Highway 44, 3 miles west of Rapid City; the road was snow-packed. The young woman slid into an oncoming car in the opposite lane. Both drivers suffered minor injuries. TENNESSEE None reported. TEXAS, Northern McLennan County 2230CST-Connally n O 0 0 0030CST Flash Flooding High water covered several low-water crossings along the White Rock Creek. 0400CST-Shelby County 10 1000CST 0 0 0 Flash Flooding Heavy rainfall of 2 to 3 inches in a 24-hour period resulted in high water covering Farm-to-Market Roads 138 and 139. 0330CST-Anderson County 10

1200CST Flash Flooding

High water resulted in the closing of several farm-to-market and county roads throughout Anderson County.

JANUARY 1991

		TIME			NO. PER	SONS	EST IN	MATED AGE	
PLACE	Đ	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-1-1-10	CHACLE	4-campoco	CECOEN	CHARACTER OF STORM

TEXAS, Northern Cont'd

Cherokee County

10 0700CST-1200CST

Flash Flooding

High water resulted in the closing of County Roads 137, 190, 130, 136, and 140. Several creeks and low-water crossings were also flooded by high water.

Nacogdoches County 10 0734CST-1100CST

Flash Flooding

Heavy rains of 3 to 6 inches in a 24-hour period resulted in several creeks and streams overflowing their banks throughout Nacogdoches County.

TEXAS, Southern

Travis, Hays Counties

0800CST-1400CST

5 Flash Flooding

On the morning of January 9th, a shallow dome of very cool air lay over all southern and central On the morning of January 9th, a shallow dome of very cool air lay over all southern and central Texas. In response to a vigorous and strengthening upper-level disturbance in western Texas, winds just above the surface began to lift very warm, moist, and unstable air from the Gulf over the top of this dome. This strong over-running and lift developed widespread thunderstorms from central Texas eastward to the Louisiana border. By 0800 CST, rainfall from these thunderstorms had averaged between 1 and 3 inches in the two counties with some locations having up to 7 inches. Persons were evacuated along Dry Creek just east of Bergstrom AFB. The rain began to end shortly after noon, with the flash flooding ending in the early afternoon. Numerous low-water crossings were flooded across the two counties. One vehicle was swept off the road in Hays County near Dripping Spring, but no one was injured.

Lee, Milam Counties 09

0900CST-1500CST

Flash Flooding

Rainfall, due to the unstable weather regime noted above by 0900 CST, had averaged between 2 and 3 inches over the two-county area, with isolated locations having received up to 6 inches. Numerous secondary roads in both counties were closed due to flooding; a bridge was washed out in Milam County. In both counties, schools were dismissed early so children could get home safely. The flooding also caused power and telephone outages.

Bastrop, Burleson. Williamson Counties Entire Area

09 1150CST-1500CST

5 Flash Flooding

Rainfall by 0900 CST had averaged between 2 and 3 inches over the two-county area, with isolated locations having received up to 4 inches. The heaviest rain continued to fall over extreme northern Bastrop County. By noon, 7.50 inches of rain had fallen in Elgin in extreme northern Bastrop County. Highway 21 was reported under water at Caldwell, in Burleson County. Numerous secondary roads were reported under water; school children were sent home early. In Williamson County, a man was rescued after his truck was swept off a county road as he tried to cross a submerged bridge. He was stranded on top of the truck for over two hours before being rescued; when the rescuers arrived, the water was only 2 inches from the top of the truck. In Bastrop County, one woman and her children were rescued from chest-high water after being stranded on a county road.

Harris County **Entire County**

10 0700CST-1330CST

2 0 Flash Flooding

A stationary frontal boundary was located from just south of the upper Texas coast southwestward along the mid- and lower-coast, to a low-pressure area just east of Brownsville. In response to a vigorous upper-level disturbance strengthening over the west, warm moist air from the Gulf began to lift up over the top of the shallow dome of cold air that covered all of

JANUARY 1991

		TIME			NO.	OF SONS	EST IN	MATED AGE	
PLACE	DAO-E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K	Omto CLZ-	-can100x1	wood	CHARACTER OF STORM

TEXAS, Southern Cont'd

southern Texas. Thunderstorms formed across Matagorda and Austin counties just before 0600 southern Texas. Thunderstorms formed across Matagorda and Austin counties just before 0600 CST as a result of this lifting motion. The storms moved toward the north-northeast at 20 mph. Rainfall was generally moderate (with occasionally heavy rain), but the rain began to accumulate faster since the storms continued to form and move across the same area over and over. Rainfall was concentrated in Montgomery, Harris, and Fort Bend counties, with Harris County receiving the greatest amount of rain. Flooding began near 0700 CST in the city of Houston as accumulations reached just over 4 inches. The Department of Public Safety reported that many of the roads across the county were under water. The rainfall began to taper off near noon and the flash flooding ended near 1330 CST.

Jefferson County Orange County

1000CST-1400CST

Flooding

Already-saturated ground became flooded, when thunderstorms produced by the system described in the above paragraph produced widespread heavy rainfall over the two counties. Rainfall averaged from 2 to 3 inches, with the maximum of 7 inches in the Vidor area. This resulted in the flooding of several homes and the closing of many secondary roads.

Lee County Giddings

14 1700CST 1.0 100 Tornado (F1)

A severe thunderstorm moved across Lee County in the late afternoon, producing a tornado and spotty heavy rainfall of up to 5 inches. The tornado struck a ranch area just southeast of Giddings, taking the roof off several hay barns and destroying another barn. The damage was spread out over the distance of nearly a half mile. Large sheets of tin were left hanging 30 to 40 feet above the ground in nearby oak trees. The tornado damaged the roof of a home 0.5-mile east of the ranch area, then dissipated.

Burleson County Lake Somerville

14 1740CST

Hail (0.75)

Three-quarter-inch-diameter hail was reported in a severe thunderstorm 15 miles south of Caldwell, near Lake Somerville in southern Burleson County. The storm was moving to the north-northeast at 15 mph.

Bastrop County Rosansky 2 SW Smithville to 3 NE Smithville

14 1750CST 14 1814CST 14 1816CST **Bastrop County**

Tornado (F0) Tornado (F2) Hail (2.00) 0 0 2 2

The Department of Public Safety and Bastrop County Sheriff's Office reported a tornado near the city of Rosansky moving to the northeast at 25 mph. The tornado lifted up and dissipated shortly afterward. About 25 minutes later, the same thunderstorm produced a second tornado that was much larger and more devastating. It first touched down 5 miles southwest of Smithville, destroying barns and fences and uprooting trees. It moved across Smithville and lifted northeast of the city, just before moving across the Bastrop/Fayette County line. Along its path it damaged three homes, destroying porches and roofs, but caused no injuries. It also killed 10 young calves in a pasture. The public reported hail as large in diameter as a hen's egg had begun to fall just before the tornado struck.

Colorado County Columbus

14 1818CST 1.5 250 1 11 7 Tornado (F1)

Department of Public Safety officers reported a tornado had touched down at 1818 CST in Columbus. The tornado first struck a trailer park, destroying four mobile homes. It injured several residents of the trailer park, one of whom died of injuries 13 days later. The tornado struck a convenience store, then lifted briefly over a residential area and touched down again. People were trapped briefly in the convenience store. Six homes were lost to the tornado with damages estimated at \$35,000 per home. Total damage was placed at several million dollars. The tornado also destroyed the historic William Harbert Plantation which was over 150 years old. Several tractor-semitrailers were damaged near Interstate 10 and two were lifted up, turned sideways and tossed on the side of the road. Power lines were knocked down and power was lost in the city for approximately 3 hours. The tornado killed one and injured 11, most of whom were residents of the mobile homes which were destroyed. (M??M)

JANUARY 1991

		TIME			NO.	OF SONS	EST II	AGE		JANUAR
PLACE	D	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-C-MO	Omocc.Z.	<u>-сендо-</u>	COCODA	CHARACTER OF STORM	

TEXAS, Southern Cont'd

Wharton County	,
Wharton	
Hungerford Lane City	
Lane City	

1.4	1818CST	0.5	50	Λ	Λ	5	Λ	Tomada (E	.11
14	1919(2)1	0.5	3 0	U	U	3	U	Tornado (F	'1)
14	1820CST	0.2	20	0	0	3	0	Tomado (F	(0)
14	1825CST	0.2	20	0	0	3	0	Torando (F	(0)
14	1830CST	0.2	20	0	0	3	0	Torando (F	(0)

Thunderstorms moving rapidly eastward across Wharton County produced a series of small and short-lived tornadoes. The first was reported by Department of Public Safety officers at 1818 CST near Wharton. It damaged the roof at a livestock auction barn; tore an awning off the high school gymnasium; damaged several sheds, and knocked down power lines in the town. Several trees were broken in half near the barn. Brief touchdowns were later confirmed in Hungerford, Lane City, and Burr.

Guadalupe County Seguin

14 1855CST

0 0 4 2 Hail (0.75)

A cluster of thunderstorms formed in western Guadalupe County as an upper-level disturbance approached from the west. One storm briefly intensified as storms around it weakened. It began to produce pea- to marble-size hail near LaVernia at 1830 CST; the storm moved northeastward at 20 mph. As the storm moved across the city of Seguin at 1855 CST, it produced 0.75-inch diameter hail.

Caldwell County Luling

14 1920CST

0 0 3 0 Hail (1.75)

Thunderstorms had formed just southwest of the city of Lockhart at 1845 CST. They moved to the north-northeast at 20 mph.

Bastrop County Red Rock

14 1925CST

0 0 0 0 Hail (1.75)

Large hail was reported in a severe thunderstorm near Red Rock.

Gonzales County Gonzales

14 1925CST

0 0 4 2 Hail (1.00)

A second thunderstorm from the same cluster as the Guadalupe County storm began to intensify around 1945 CST. This storm also moved to the northeast (at 20 mph), toward the city of Gonzales. On radar, it showed a tendency toward rotation at 1955 CST, then ended the rotation after a few minutes. The storm reached the city of Gonzales around 1920 CST, and began to produce 1-inch diameter hail at 1925 CST. The storm then weakened as it moved northeastward out of the city.

Matagorda County Matagorda Bay City

14 1945CST 0.6 0 0 3 0 Hail (1.75) 14 1955CST 0.6 15 0 0 3 0 Tornado (F0)

A cluster of intense thunderstorms entered the western portion of Matagorda County near 1930 CST, moving to the northeast at 25 mph. At 1945 CST, spotters reported marble- to golf ball-size hail in a severe thunderstorm in the city of Matagorda. At 1955 CST, a second severe storm produced a tornado at Bay City. The tornadic winds blew two cars into a ditch on the Van Vleck Road, but caused no injuries.

Guadalupe County Seguin

14 2000CST

0 0 4 2 Hail (1.00)

The third, and final, severe thunderstorm developed at 1940 CST from the same cluster as the previous Guadalupe County and Gonzales storms above. It began to intensify rapidly after formation, with a well-defined flanking line and a suggestion of rotation in its large, single updraft area. It began to produce marble-size hail at 1955 CST as it moved into the city of Seguin. Just as it reached its greatest intensity, the cells to its southeast (inflow side) re-formed into a weak line that cut off flow to this storm. The storm began to produce hail of up to 1 inch in diameter for a few minutes, then began to weaken as it moved out of the city.

JANUARY 1991

		TIME			NO. PER	OF SONS	ESTI!	MATED AGE		
PLACE	D E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	Kirimo	CMISSOLE		S TO TO	CHARACTER OF STORM	

TEXAS, Southern Cont'd

Brazoria County Southern Brazoria County

14 2010CST

Thunderstorm Wind (G75)

Widespread minor wind damage was reported across southern Brazoria County as thunderstorms moved eastward. Three homes were damaged in Bridge Harbor, where the U.S. Coast Guard recorded winds blowing at a steady 40 mph with gusts to over 80 mph. The wind overturned boats and ruptured a fuel supply line. Fencing around a tennis court at a school in Sweeny was also damaged.

Harris County (Hou) Hobby Arpt 14 2033CST

2 Hail (0.88)

Large hail was reported in a severe thunderstorm at Houston Hobby Airport.

Duval County San Diego

14 2015CST

0 4

Several thunderstorms developed in an area of convection in western Webb County near 1900 CST. The area moved northeastward at 20 mph, and began to form into a line as it entered Duval County shortly after 1930 CST. The first indication of severe weather occurred near 2035 CST when one of the storms in the line, located about 5 miles west of the city of San Diego, began to intensify rapidly. At 2050 CST, the Duval County Sheriff reported golf ballsize hail in the city of San Diego.

Jim Wells County Alice

14 2115CST

0 Hail (1.50)

The severe thunderstorm which produced large hail close to Alice was near the southern end of the line of thunderstorms indicated in the Duval County report above. At 2115 CST this storm, located just southwest of Alice, began to produce Ping-Pong ball-size hail in the city, as reported by the police.

Galveston County 5 NW Dickinson Southwestern Galveston County Southwestern Galveston County

14 2140CST 14 2145CST Tornado (F1) 0 Hail (1.75) 14 2200CST Thunderstorm Wind (G52)

The line of thunderstorms which moved across Calhoun and Matagorda counties was indicated by radar in eastern Brazoria County at 2130 CST. They had continued to move to the east-northeast, but had accelerated to a speed of 35 mph. As the storms moved into Galveston County near 2140 CST, the Santa Fe Police Department reported damage to the roof of an outbuilding just west of Dickinson. The damage was believed to be due to a tornado. As the storms continued to cross Galveston County, several reports were received of hail and damaging winds. Golf ball-size hail was reported at 2145 CST at Sea Isle on Galveston Island, some 25 miles southwest of the city of Galveston. Golf ball-size hail was also reported by a bridge tender at San Luis Pass in the extreme southwestern edge of the county at 2152 CST. There were widespread reports of pea- to marble-size hail across Galveston County between 2130 CST and 2200 CST. 2200 CST.

Fort Bend County Fulshear

14 2226CST 0.7 12 3 Tornado (F0)

The public reported a tornado near Fulshear in Fort Bend County. Radar showed thunderstorms in the area moving east at 25 mph.

Chambers County Anahuac

14 2230CST

0 2 0 Thunderstorm Wind

Gulf States Utilities reported power lines and poles downed near Anahuac in Chambers County at 2030 CST.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST II	AATED AGE		JANUART	.,,,
PLACE	D E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	KILLINO	OTTO CZ	4-00m00xx	CECOEN	CHARACTER OF STORM		

TEXAS, Southern Cont'd

Matagorda County (PSX) Palacios

14 2245CST

0 0 3

Thunderstorm Wind (G62)

The airport at Palacios reported a wind gust to 62 knots in severe thunderstorms.

Calhoun County Port Lavaca

14 2250CST

0 0 4

Thunderstorm Wind

Power lines were reported to have been blown down by a thunderstorm in Port Lavaca.

Jefferson County 16 SW Beaumont

15 0001CST

0 0 4

0 Thunderstorm Wind

Two mobile homes were damaged along with several other small buildings, near a petroleum reserve, some 16 miles southwest of Beaumont near midnight. Radar reported possible severe thunderstorms (from near High Island to 50 miles offshore), moving to the northeast at 30 mph.

Galveston County Scholes (GLS)

15 0007CST

0 0 3

0 Thunderstorm Wind (G54)

A thunderstorm produced a wind gust to 54 knots (62 mph).

Chambers County 17 SW Winnie

15 0030CST

0 0 3

Thunderstorm Wind

Gulf States Utilities reported power lines downed by thunderstorms.

Montgomery County Western Montgomery

15 0345CST-0900CST

0 0 4 0 Flash Flooding

The Montgomery County Sheriff's Department reported flash flooding in the western part of the county, near Magnolia along Walnut Creek. Water rose over the bridge on Walnut Creek Road, and over parts of Nichols Sawmill Road and Walden Road. A woman and her 6-year-old daughter were trapped in their car when it was swept some 100 feet into Walnut Creek; they climbed on top of the vehicle and were later rescued. A second woman was briefly trapped when her sports car flooded out in an underpass in Conroe. Rainfall began to diminish in the area near 0700 CST, with the flash flooding ending near 0900 CST.

Bexar County Entire County

18 0300CST-0700CST

0 0 4 2 Flash Flooding

Rainfall had been estimated at near 1 inch per hour, and had continued for 3 hours in Bexar County. Leon Creek was reported to be rising rapidly. Jones Maltsberger Road in Alamo Heights was under water by 0500 CST and flooding was reported on Salado Creek. Rainfall had averaged, by 0500 CST, between 1 and 3 inches over the county, with the highest totals estimated at near 4 inches. A woman was rescued when her car stalled on Schertz Road where it crosses Perrin Beitel Creek. Shortly afterward, a second woman was rescued from the same area after her car was swept under some railroad tracks.

Guadalupe County Entire County

18 0530CST-0900CST

0 0 4 2 Flash Flooding

Thunderstorms produced general 2- to 4-inch rains, with isolated totals of up to 6 inches. This caused widespread flooding in the county. Several secondary roads were reported to be under water. Residents were evacuated from their homes in one subdivision in northwestern Seguin at 0530 CST, as Walnut Creek went out of banks. Seguin Police rescued two motorists stranded in floodwaters.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST 11	MATED AGE	
PLACE	DA) E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K I L L L L L L L L L L L L L L L L L L	- X J J Z M	4-2 8 m50200	CAODA	CHARACTER OF STORM

TEXAS, Southern Cont'd

Colorado County 10 W Eagle Lake
10 W Eagle Lake Eastern Colorado
County
Chesterville

18 0705CST 18 0710CST	0.5	50	0	0	3 0	0	Torando (F1) Thunderstorm Wind
18 0725CST	0.2	30	0	0	3	0	Tornado (F0)

A tornado touched down 10 miles west of Eagle Lake at 0705 CST. It damaged a barn, tearing off a portion of the roof and tossing it onto a road several hundred feet away. As the parent thunderstorm that spawned the tornado moved to the east-northeast at nearly 40 mph, it caused minor wind damage to a mobile home and satellite equipment, and tore the roofs off two homes in Eagle Lake. It blew a large tree over on Calhoun Road and broke limbs of 6 to 8 inches in diameter off several other trees. A second tornado was produced by the thunderstorm as it reached Chesterville, causing major roof damage to a barn and knocking down power lines; the tornado then dissipated. Additional wind damage was visible from near Chesterville to the Austin County line.

Austin County Southern Austin County

18 0730CST 0 0 4 0

The Colorado County storm continued to produce damaging winds as it moved eastward into Austin County. Minor damage was reported to sheds and vehicles from the county line eastward. The wind-damage path finally dissipated near San Felipe on the Austin-Waller County line.

Thunderstorm Wind

Colorado County 20 NE Columbus

18 0730CST 0.4 10 0 0 3 0 Tornado (F0)

A second tornado was spotted 20-miles northeast of the city of Columbus in the northern portion of this area of thunderstorms at 0730 CST.

Harris County Katy 5 WNW Houston 15 SW (IAH) Houston

18	0745CST	0.5	15	0	1	3	0	Torando (F0)
18	0815CST	0.4	8	0	0	3	0	Tomado (F0)
18	0830CST	0.5	10	0	0	3	0	Tomado (F0)
18	0850CST	1.5	40	0	3	4	Ó	Tornado (F1)

The thunderstorm cluster indicated in the two tornado reports (in Colorado County above), continued its movement to the east at 35 mph reaching Harris County just before 0800 CST. At 0800 CST, the Katy Police Department reported a tornado near Peek Road and Mason Road. It caused damage to the roof and many of the windows in an elementary school, uprooted several trees, and twisted fencing around the playground. No students were injured since the staff had urged parents to delay the students' arrival for class. One teacher was injured while walking toward the school. The tornado also knocked down power lines in the Katy area. The thunderstorms began to form a line as they moved across Harris County just after 0800 CST. At 0815 CST, a second tornado was reported 5 miles to the west-northwest of the city of Houston at the intersection of Bingle and Kempwood Roads. It tore the roof off a two-story building in a commercial complex. A third tornado was reported at 0830 CST some 15-miles southwest of Houston Intercontinental Airport, on the northwestern edge of the city of Houston. The last tornado in the event occurred in the Maple Leaf Gardens subdivision in the city of Houston at 0850 CST, destroying three trailer homes and causing damage to at least ten others. Three people were injured by the tornado. It was by far the largest and longest-lived of the four tornadoes. The storm system was responsible for power failures in over 30,000 homes.

Matagorda County Bay City

18 1000CST 0.2 20 0 0 3 0 Tornado (F0)

A small tornado was sighted in a thunderstorm at the Bay City Municipal Airport near 1000 CST. It caused minor damage on the airport property and knocked out phone lines.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST IN	AATED AGE	
PLACE	D E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K	OHWC LE	4-60mm0030-0	CECOTA	CHARACTER OF STORM

TEXAS, Southern Cont'd

Brazoria County Lake Jackson

18 1020CST 0.4 11 0 0 5 2 Tornado (F0)

Thunderstorms moving to the east near 25 mph entered Brazoria County around 1000 CST. A spotter reported that a small tornado accompanied by heavy rain touched down in Lake Jackson. Witnesses saw it lift a pickup truck off the ground and turn it on its side. It damaged an apartment complex, tossing air conditioning units around, damaging roofs, and breaking windows. Residents of the complex reported hearing a roaring sound as the tornado struck. A mobile home was lifted up and damaged, with the owner inside reporting "a steady roar like a train coming." The tornado also downed power lines, snarled traffic lights, and caused a blackout in parts of Lake Jackson.

Galveston County 20 SW Galveston 15 WNW Galveston Scholes (GLS)

18 1045CST 18 1045CST	0	0	0 0	0	Thunderstorm Wind (G61) Thunderstorm Wind
18 1059CST	0	0	0	0	Thunderstorm Wind (G55)

Widespread reports of minor wind damage were received from around Galveston County as thunderstorms moved across the area on the morning of the 18th. Wind gusts to 61 knots were reported on the west end of Galveston Island, with gusts to 55 knots indicated at Scholes Field.

TEXAS, Western

Most of Western Texas

03 Early AM-04 Evening 0 0 3 1 Ice Storm

An Arctic cold front moved through all of western Texas except the extreme western portion. Areas of freezing rain and freezing drizzle developed across much of the region during the morning of the third. The resulting ice brought hazardous driving and walking conditions to much of the area. Although no casualties and only minor damage could be directly attributed to the weather, numerous traffic accidents occurred. Two people were killed and 11 injured as a result of accidents on the icy roads.

Panhandle and South Plains

09

0 0 2 1 Ice Storm

A small, but vigorous, upper-level disturbance tracked across the western south plains and panhandle. The disturbance produced a swath of heavy snow from west of Lubbock to near Amarillo. Up to 10 inches of snow fell over portions of Amarillo, with 5- to 8-inch totals common across the western panhandle. Snow totals of 4 to 6 inches were reported across the northwestern south plains. Only minor damage was caused by the fall of the heavy, wet snow.

Permian Basin

29 Afternoon-30 Afternoon

0 0 3 1 Ice Storm

Another Arctic front moved through western Texas, bringing a mixture of freezing rain, sleet, and snow to the Permian Basin. Traffic in the Midland-Odessa area on the mornings of the 30th was slowed to a crawl by the ice-covered roadways. Numerous weather-related accidents occurred across the area, but only minor damage was directly attributed to the winter weather, and no injuries were reported.

UTAH

UTZ001-003 Northwestern Valleys 02 0500MST-03 1200MST

4 18 5 0 Dense Fog

High pressure over the area created a strong inversion which in turn caused areas of dense fog. One area of dense fog formed in a low-lying area of Interstate 215 just south of the Great Salt Lake during the morning of the 3rd. This caused four multi-vehicle accidents involving 52 vehicles; the accidents resulted in 4 fatalities and 18 injuries.

JANUARY 1991

		TIME			NO.	SONS	EST II	AATED AGE	
PLACE	DAO-E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	Killeo	CHWC-Z1	4-cam 00.00 A	COCOLIA	CHARACTER OF STORM

UTAH Cont'd

UTZ005-006-007 008-011 Southern Utah

2000MST-0900MST

3 Heavy Snow

An upper-level trough over southern California spread a very moist air mass over the southern half of the state. Although the brunt of the storm was felt in the southern half of the state, light snow fell as far north as Vernal and the southern end of the Salt Lake Valley. Valley locations in the southern half received 6 to 16 inches while the mountains received 10 to 18 inches. Moab received 8 inches of snow, the most in a 24-hour period since 1949. Two dozen drivers lost control of their vehicles on Interstate 15 at the southern end of the Salt Lake Valley. No serious injuries were reported.

Iron, Beaver, and Millard Counties

0130MST-Ω4 0900MST

Ω 3 0 Freezing Rain

Because of the cold air still trapped in many of the valleys of southwestern Utah, freezing rain occurred as the same upper-level trough advected in a warm, moist air-mass over the area. Tractor-semitrailers jackknifed and an unspecified number of cars slid off of a section of Interstate 15 between Cedar City and Beaver. No injuries were reported.

UTZ001-002-003-006-010 Northwestern Valleys and Mountains

08 1200MST

Heavy Snow Dense Fog 3

A weak, our moist, storm located over northern Nevada intensified over the northwestern portion of the state. The heaviest reported snowfall was over northwestern Utah with lighter amounts received across the remainder of the state. The valleys received 6 to 12 inches and mountains 10 to 14 inches. Because of the storm, roads in the northwestern portion were snowpacked and slick, causing numerous accidents. Three separate accidents along the Wasatch Front resulted in three deaths and three injuries. The heavy snow also caused power outages in several areas along the Wasatch Front. After the snow ended and skies cleared, dense fog formed in the western valleys. A weak, but moist, storm located over northern Nevada intensified over the northwestern portion

UTZ001-002-003-

006 Western Valleys 08 1830MST-09

1000MST 0 0 O 0 Dense Fog

With the air mass still moist from the previous storm, widespread dense fog re-formed in the valleys of western Utah from Cedar City to the Utah-Idaho border.

UTZ001-002-003-

0700MST-

16 0500MST 5 Heavy Snow

010-011 Northwestern Valleys and All Mountains

A series of weak disturbances embedded in a moist northwestern flow had been giving the northwestern valleys some light snow and local freezing rain, and nearly continuous light snow to the northwestern mountains since the 12th. The heaviest snow then occurred in all the mountains on the 15th and 16th. Valley locations received 6 to 12 inches, with 12 to 18 inches reported at most mountain locations. A few mountain areas had locally higher amounts. For example, Alta Ski Resort had a 24-hour total of 33 inches ending at 0500 MST on the 16th. Because of the heavy snowfall and the high-water content of the snow, several avalanches occurred in canyons along the Wasatch Front from Provo to Ogden on the 15th. One avalanche in Big Cottonwood Canyon pushed a vehicle off the road. The four people in the vehicle suffered minor injuries. Due to slick and snowpacked roads dozens of accidents occurred in the northwestern valleys on the morning of the 16th. Fortunately, only two people suffered minor injuries as a result of the large number of accidents. On the morning of the 15th, the roof of a building collapsed under the weight of heavy snow. building collapsed under the weight of heavy snow.

VERMONT

Statewide

11 1700EST

5 0 Snow

Snow accumulated to between 8 and 14 inches across Vermont.

		TIME			NO. PER	OF SONS	EST II	AGE	
PLACE	DA E	LOCAL	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-1-IIIO	I W JUNEO	4-com 00300	COCOLO	CHARACTER OF STORM

VERMONT Cont'd

Southeastern Vermont

31 1600EST

13 0 Snow Squall

Snow squalls throughout the zone created localized white-out conditions. The worst of these occurred about 1600 EST on Interstate 91, near Brattleboro. In this accident a 17-year-old female was pinned in a car for three hours; the vehicle was crushed under the weight of two logging trucks. A total of nine persons were injured in the 15-car mishap near Brattleboro.

VIRGINIA

VAZ005-011

0200EST-1900EST

0 0 Heavy Snow

Several inches of snow fell across northwestern Virginia. Representative totals included: 7 inches at Delaplane; 6 inches at Woodstock and Washington, VA; 5.5 inches at Winchester; and 4 inches at Dulles International Airport (IAD), northern Arlington County, and Broadway.

VAZ003-007-017

1500EST-0500EST-

09

Ice Storm

Several hours of freezing rain and drizzle coated roads throughout east-central and northern Virginia, leading to innumerable traffic accidents and many power outages. A man in Farmville was killed in a weather-related traffic accident.

VAZ005-011-013

0000EST-2100EST 11

0 0 5 Heavy Snow 0 Glaze

Four to 6 inches of snow fell across the northern Shenandoah Valley, and in Loudoun and northern Fauquier counties in extreme northern Virginia; also in parts of the west-central Highlands area. Representative snowfall totals included: 5 inches at Winchester and Bergton; 4 inches at The Plains and Linden. Freezing rain fell in the latter stages of the storm causing power outages. Some damage was also reported from trees falling onto houses in Bath County.

VAZ005-010-014-015

0000EST-2100EST

0 Ice Storm

Significant accumulations of freezing precipitation occurred across Rappahannock and Culpeper counties and southern Fauguier County, south and southwest through the Piedmont and Blue Ridge areas. Thousands were without power due to downed trees and power lines. The Blue Ridge Parkway running through Patrick, Henry, Floyd, and Roanoke counties was closed, and it has been estimated that several months will be needed to complete cleanup work from damage caused by ice-covered trees and wires downed by high winds. A man lost his life in Farmville in a weather-related traffic accident.

VAZ014

0000EST-

13 0000EST

0 Flooding

Widespread minor flooding occurred in southwestern Virginia. In Vinton, a woman drove through barriers set up to warn of water over the bridge. She died when her car stalled in the water which was about 3 feet over the bridge, and the water swept the car off. (F31V)

WASHINGTON

WAZ001-003

Puget Sound Area 06 1500PST-2300PST Southwestern Interior WAZ002

1500PST-Northwestern 2300PST Interior

0 0 0 0 Heavy Snow

? 0 0 0 Heavy Snow

JANUARY 1991

		TIME			NO. PER	OF SONS	EST I	MATED AGE	
PLACE	DAO-E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-1-m0	CHACLE	4-120m2020	CECOEN	CHARACTER OF STORM

WASHINGTON Cont'd

WAZOOE

Eastern Washington 07 Morning

0 0 0 ? Heavy Snow

A Pacific weather system moved into western Washington on the afternoon of the 6th. With cold air over the area, the precipitation initially fell as snow. Snow amounts of 2 to 4 inches were reported in Kitsap County and between Olympia and Chehalis. With northeastern winds flowing out of the Fraser River Canyon into northwestern Washington, the snow lasted into the evening of the 8th. Snow amounts around Bellingham ranged from 4 to 12 inches. As the system moved into eastern Washington on the 7th, more snow was reported with the heaviest amounts in the northeastern corner of the state. Both Spokane and Colville received 4 to 6 inches while across the rest of eastern Washington amounts ranged from 1 to 3 inches.

WAZ006 Northeastern Washington

09

0 0 0 ? Heavy Snow

A cold front moved out of British Columbia and clipped the northeastern corner of the state. The heaviest snowfall occurred in the extreme northeastern corner with Colville reporting 6 inches of new snow. Snowfall amounts around Spokane ranged from 1 to 3 inches.

WAZ010 Whitman County

13 1200PST

0 0 5 ? Flash Flood

The combination of heavy rains and warming temperatures, on the evening of the 12th and the morning of the 13th, caused the North Fork of the Palouse River to overflow its banks. The hardest-hit area was the Colfax Golf Course where a wall of water, along with numerous chunks of ice, covered the course. Damage elsewhere was minor with a few roads around the Colfax area closed for a time due to the high water.

WAZ009 Adams County

28 1000PST-1300PST

0 0 5 ? High Winds

Northern winds in the wake of a cold front gusted to 70 mph in Othello. A few houses in the area lost portions of their roofs. Scattered power outages were reported due to trees falling over lines.

WEST VIRGINIA

WV001 002-003 Ohio River

01 0000EST-02 1600EST

0 0 ?

River Flood

The Ohio River crested at its highest levels since 1979 for many river towns. The crest was 2-to 5-feet higher than the minor flooding that occurred less than two weeks earlier.

The wet December had saturated the ground in the upper Ohio Valley. For example, over 8 inches of total precipitation fell at Parkersburg for the wettest December on record. The rain event of December 30th, when 1.50 to 2 inches fell, was the final event leading to the flood.

Homes were evacuated in low-lying areas as water surrounded the dwellings. City streets and rural routes paralleling the river were blocked. Backwater flooding occurred near mouths of creeks and the larger tributaries, such as the Little Kanawha and Kanawha Rivers.

Crests included:

Wellsburg Pike Island Moundsville Hannibal Lock	38.8 ft 39.3 ft 39.5 ft 35.1 ft	0400EST 0700EST 1000EST 1400EST	Jan	lst
Willow Island Parkersburg	38.8 ft 39.0 ft	1800EST 1900EST		
Belleville	41.3 ft	0300EST	Jan	2nd
Racine Pomeroy	46.5 ft 49.4 ft	0600EST 0600EST		
Pt. Pleasant	46.3 ft 50.4 ft	1200EST 0900EST	Jan	2nd
Gallipolis Huntington	51.7 ft	0900EST		

		TIME			NO.	OF SONS	EST IN	ATED AGE		JANUARY 1991
PLACE	D A	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	K-LLEED	Ombo CL21	4-tama028-	CEOPN	CHARACTER OF STORM	

PLACE	D E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	Comp	CHIXCLZ!	4-tamooaa	റയാസ	CHARACTER STORM	
WEST VIRGINIA	A C	ont'd								
WV002-005- 009-010-011 Northern Counties	06 07	2100EST- 1200EST			0	0	0	0	Heavy Snow	
and Eastern Panhandle	the	mountains.	Grafton n	neasured 7	inche	s; Mo	organto	wn an	at extended west to d Philippi 5 inches; son for zones 2 and	Parkersburg and
WV010-011 Eastern Panhandle	11	0000EST- 1000EST			0	0	0	0	Heavy Snow	
	Bu	other 4- to 7 rlington rep nklin had 4	orted 7 in	vstorm affe ches; Key	ected ser, (count Cacap	ies east on, an	t of the d Pete	Allegheny Front. ersburg all measured	Martinsburg and 5 to 6 inches;
WV009-012 Northern and	21 22	0000EST- 0700EST			0	0	0	0	Heavy Snow	
Central Mountains	of . Che	w was the r January 22r eat Bridge,	esult of a o d included and Canna	cold and m I 15 inches an Valley;	oist v s at P 9 inc	vind f icken hes a	from th s; 11 i t Richy	e nortl nches wood;	to 14 inches over howest. Snow depthe at Thomas; 10 inches at Te Valley Head had 6 inches at 6 inches at 6 inches at 6 inches at 7 inches	s on the morning les at Snowshoe, rra Alta. In the
WISCONSIN										
WIZ011-012-013- 014-016-017-	10 11	Evening in Late Even	nto ing		0	0	?	0	Heavy Snow	
018-019-020 Southern Wisconsin	the	to 10.5 inc heaviest ar cine 10.3 in	nounts. S	Snowfall ar	noun	ts inc	luded	onsin Wind	with southeastern p Lake (Racine Coun	ortions receiving ity) 10.5 inches,
WIZ001-002 Lake Superior	20 20	Early Even			0	0	?	0	Heavy Snow	
Snowbelt	mo	avy snow so st affected t lected 12 in	owns were	e Wentwor	erior th, P	snow oplar	belt res , and N	gion de Maple	eposited 6 to 12 inch of northern Dougla	nes of snow. The s County, which
WYOMING										
WYZ012-016-017 Eastern Plains	12	0800MST 1400MST			0 -	0	0	0	High Winds	
Laramie Valley Southeastern Plains	Wi gus	nd gusts up at to 65 mpl	to 60 mph occurred	n blew acro at Vedauv	oss the	e high round	ner elev 1130	vations MST.	s of southeastern W	yoming. A peak
WYZ001-004-007 Northwestern, Big Horn, and	14 15	2000MST 0600MST			0	0	0	0	Heavy Snow	
Western Mountains	Sno	owfall of 6	to 10 inch	es occurred	d in t	he mo	ountain	s of n	orthern and western	Wyoming.
WYZ004 Big Horn Mountains	22	0400MST	<u>'</u> _					÷		

2200MST Heavy Snow

Snowfall of 6 to 10 inches occurred in the northern and central parts of the Big Horn Mountains.

JANUARY 1991

		TIME			NO. PER	OF SONS	EST IN	ATED AGE		JANUART 1	991
PLACE	D A T E	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	KILLED	OMBCLZ-	~~am10020	ORODO	CHARACTER OF STORM		

WYOMING Cont'd

WYZ012-015-016-017

Eastern Plains Southern Mountains Laramie Valley Southeastern Plains 27 0800MST-1800MST

0 0 0 0 High Winds

Strong winds blew across the higher elevations of southeastern Wyoming. Gusts up to 65 mph were recorded at Vedauwoo at 1300 MST.

WYZ012-015-016-017

Eastern Plains Southern Mountains Laramie Valley Southeastern Plains 30 0600MST-31 0800MST

0 0 0 High Winds

Periods of strong winds buffeted the higher elevations of southeastern Wyoming. Gusts to 70 mph were logged near Wheatland around 1415 MST on the 30th, while gusts to 85 mph also occurred infrequently in the same area, from 2100 MST on the 30th to 0400 MST on the 31st.

ALASKA, Southeastern

AKZ012 Lynn Canal and Glacier Bay 02 Early Morning Late Evening

0 ? ? 0 High Winds

As intense Arctic high-pressure system built over the Yukon Territory, pressure gradients increased over the northern panhandle of Alaska. Sustained winds as high as 41 mph and gusts up to 63 mph were recorded at Skagway.

AKZ-016 Eastern Gulf Coast 30 Late Evening 31 Early Evening

O ? ? O Heavy Snow

AKZ-012 Lynn Canal and Glacier Bay

31 Morning 01 Early Afternoon

0 ? ? 0 Heavy Snow

A nearly-stationary low-pressure system in the eastern Gulf of Alaska produced heavy snow north of an Arctic front, which lay over the northern panhandle and across the northeastern gulf. Between midnight and 0430 AST on the 31st, 6 inches of snow fell at Haines at the northern end of Lynn Canal. Twenty-four hours later, more than 2 feet of new snow had fallen. Gusty winds produced blowing and drifting snow at times. On the eastern gulf coast, Yakutat received over 12 inches of snow on the 31st as well as a few hours of freezing rain.

ALASKA, Southern

Bristol Bay, Coastal, Cook Inlet, Susitna Valley, St. Paul Island 18- 1200UTC 19

0 0 0 Winter Storm

An intense 946-millibar low-pressure system moved northward across the western Alaska Peninsula to the Yukon River Delta where the storm weakened. Blizzard conditions were reported at St. Paul Island for most of the 18th and into the early morning of the 19th with wind speeds of 45 to 50 mph. Bristol Bay and Cook Inlet experienced locally high winds. Along the western slopes of the Alaska Range at Port Alsworth, a peak wind of 69 mph was recorded. In the Anchorage area, the storm produced high winds along eastern hillside neighborhoods; a 63 mph gust was reported.

Cook Inlet Susitna Valley 19- 0000AST

20

0 1 0 0 High Wind

A strong low-pressure area moved northward through the Gulf of Alaska and turned northwest across Kodiak Island and the eastern side of Cook Inlet during the night. An unofficial peak gust of 127 mph was recorded by a citizen's wind equipment at high elevation. Chugach Electric Association reported that weather-related power outages resulted in service interruption to as many as 4,000 customers.

JANUARY 1991

ſ			TIME			NO. PER	OF SONS	EST IN	MATED AGE		JANUARI
	PLACE	D	LOCAL STANDARD	LENGTH OF PATH (MILES)	WIDTH OF PATH (YARDS)	KILLIED	סשאכניבי	~~~~ 0.00000000000000000000000000000000	CEOPN	CHARACTER OF STORM	

ALASKA, Southern Cont'd

Western Alaska Peninsula Eastern Aleutians 23- 0000AST 24

High Winds

St. Paul Island

An intense low-pressure area moved from the north Pacific to the western Bering Sea early on the 23rd. Wind gusts to 101 mph were recorded at Shemya Air Force Base. Amchitka Island reported sustained winds to 69 mph with gusts to 96 mph. The strongest winds at St. Paul and Cold Bay were on the 24th. Wind gusts reached 60 mph at Cold Bay and 54 mph at St. Paul.

St. Paul Island

High Winds

A strong area of high pressure over Siberia and the northern Bering Sea produced strong northeastern winds across the Bering Sea. A gust of 55 mph was recorded at St. Paul on the morning of the 30th. Several ships in the nearby coastal waters reported winds in excess of 50 knots. Buoy reports indicated seas as high as 33 feet.

HAWAII

Hawaii All Islands

27

0 Wind, Flooding

A cloud and shower band, associated with a deep low-pressure system moving eastward just north of the state, moved southeastward down across the chain. It crossed Kauai shortly after midnight, Oahu during the predawn hours, Maui around noon, and the Big Island in the afternoon. The Kona side of the Big Island sustained most of the damage, due to wind and heavy rain, though scattered damage occurred on Maui also. Only minor damage occurred on Oahu and Kauai. A number of boats were lost or sustained severe damage at Kona as winds locally gusted to 60 to 80 mph. Seven homes in the Kona area also lost their roofs. A residence in the Fern Forest in Puna was blown off its foundation and landed on a car. Heavy rains on the Kohala and Kona slopes caused extensive flooding and erosion of secondary roads. Damage to boats at Kona alone exceeded \$1 million. to boats at Kona alone exceeded \$1 million.

PACIFIC

None reported.

PUERTO RICO

None reported.

VIRGIN ISLANDS

None reported.

CORRECTIONS

OCTOBER 1990

WEST VIRGINIA - Page 71 - First line of narrative should read:

Remnants of Tropical Storm Marco dumped 3.5 inches of rain between 0100 and 0700 EST.

DECEMBER 1990 - STORM SUMMARY - Page 101 - National Floods Deaths & Injuries Totals

<u>Floods</u>	Was	Change To
Deaths Injuries Property Dan	10 40	7 7
Property Dan Crop Damage	:500 B	

TYPE	A LABAMA	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECT-COT	DELAWARE	FLORIDA	GEORGIA	IDAHO	ILLINOIS	INDIANA	IOWA	KANSAS	KENTUCKY	LOUISIANA	MAINE	MARYLAND & DC	MASSACHUSETTS	MICHIGAN	MINNESOTA	MISSISSIPPI	MISSOURI	MONTANA	NEBRASKA	ZE>4D4	NEW HAMPHORE
TORNADOES Number Days Deaths Injuries Property Damage Crop Damage HAIL Deaths Injuries		A	3		0		-	A 730560 001	10040		3			0		1 10050	c	٠	0	0	0		0		~	0	E
Deaths Injuries Property Damage Crop Damage THUNDERSTORM WINDS Deaths Injuries Property Damage Crop Damage HIGH WINDS	00~0							0562								0240						0040					
Deeths Injuries Property Damage Crop Damage LIGHTNING Deeths Injuries Property Damage Crop Damage FLASH FLOODS				0-30		OOMO																		OMO			
Deeths Injuries Property Damage Crop Damage FLOCOS Deeths Injuries			OMO						0000	001	00	00?? m			00	001						0000 000					0000
Property Damage Crop Damage HEAVY SNOWSTORMS AND BLIZZARDS a Deaths Injuries Property Damage Crop Damage									25	8	7	80 00**	0040		5	0	0000					8			0??0		0000
ICE STORMS # Deaths Injuries Property Damage Crop Damage HURRICANES AND TROPICAL STORMS Deaths		00?0					0000				0065						00?0	0050									0070
Deaths Injuries Property Damage Crop Damage ALL OTHERS Deaths Injuries Property Damage Crop Damage	,		3000	5000					0043	100 0																	

	STORM SUMMARY													JANUARY 199													
TYPE	ABOUNT COX	ZEJ MEXICO	X20 Y02X	NORTH CAROLINA	NORTH DAKOTA	OHIO	OKLAHOMA	OREGON	PENNSYLVANIA	KHODE HOLAND	SOUTH CAROLINA	SOUTH DAKOTA	THE STATE OF THE S	TEXAS	H	VERMONT	VIRGINIA	340HHZGHOZ	BEST VIRGINIA	HINCONNIE	¥0.M-zg	ALASKA	HAUAH	PACHFIC	סטייא סאאחנים	VIRGIN LOLANDS	MATIONAL DEATHS
TORNADOES Number Days Deaths Injuries Property Damage Crop Damage HAIL Deaths Injuries Property Damage Crop Damage THUNDERSTORM WINDS Deaths Injuries Property Damage Crop Damage Crop Damage Crop Damage		0		0						0			0	221575 0042 0042							0	#		0	0	0	20 20 7
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HEAVY SNOWSTORMS AND BLIZZARDS a Deaths Injuries Property Damage Crop Damage ICE STORMS # Deaths Injuries Property Damage Crop Damage Crop Damage HURRICANES AND TROPICAL STORMS	0040 0040		Ortho Nagoo			OCINO	0-200	1202	0040		0020			٥٥٨٦ ٥٥٨٦	MOUND DOMO	O1700	0000	000?		00?0		,					78 78
Deaths Injuries Property Damage Crop Damage ALL OTHERS Deaths Injuries Property Damage Crop Damage											NOOO	0400			4ENO					,							150

STORM DAMAGE CATAGORIES

REFERENCE NOTES

2 3 4 5 6 7 8	Less than \$50 \$50 to \$500 \$500 to \$5,000 \$5,000 to \$50,000 \$50,000 to \$500,000 \$500,000 to \$5 Million \$5 Million to \$50 Million \$50 Million to \$500 Million \$500 Million to \$5 Billion	0/Blank * ** @ # # # o/c	None reported. Miles instead of yards. Yards instead of miles. Includes heavy sleet storm. Freezing drizzle and freezing rain, commonly known as glaze. Report incomplete. Report not received. Indicates Crop Damage amount is included in the value given for property damage.
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When reports are not received or are incomplete, the Storm Summary National Death and Injury totals may also be incomplete.

Definition of Fujita Tornado Scale (F scale)

(FO) Gale tornado (40-72 mph): Light damage Some damage to chimneys; break branches off trees; push over shallow-rooted trees; damage sign boards.

(F1) Moderate tornado (73-112 mph): Moderate damage The lower limit (73 mph) is the beginning of hurricane wind speed; peel surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads.

(F2) Significant tornado (113-157 mph): Considerable damage Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.

(F3) Severe tornado (158-206 mph): Severe damage Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off ground and thrown.

(F4) Devastating tornado (207-260 mph): Devastating damage Well-constructed houses leveled; structure with weak foundation blown off some distance; cars thrown and large missiles generated.

(F5) Incredible tornado (261-318 mph): Incredible damage Strong frame houses lifted off foundations and carried considerable distance to disintegrate; automobile-sized missiles fly through the air in excess of 100 m; trees debarked; incredible phenomena will occur.

(F6-F12) (319 mph to Mach 1, the speed of sound): The maximum wind speeds of tornadoes are not expected to reach the F6 wind speeds.

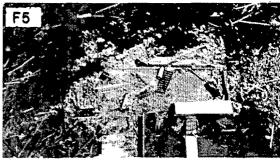
(F0+F1) Weak Tornado (F2+F3) Strong Tornado (F4+F5) Violent Tornado

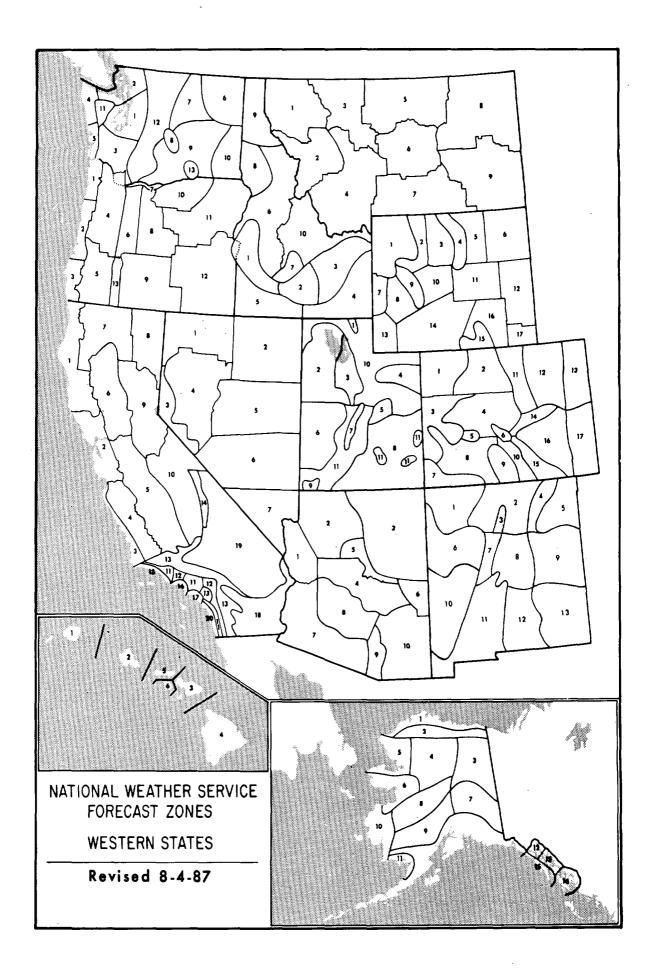
From J. Atmos. Sci., August 1981, p. 1517-1519

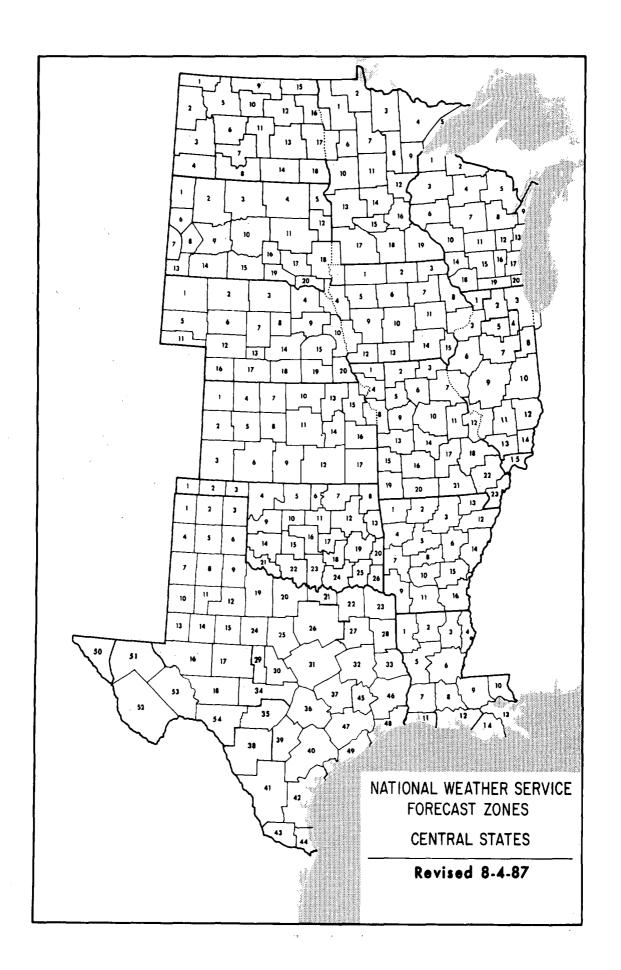


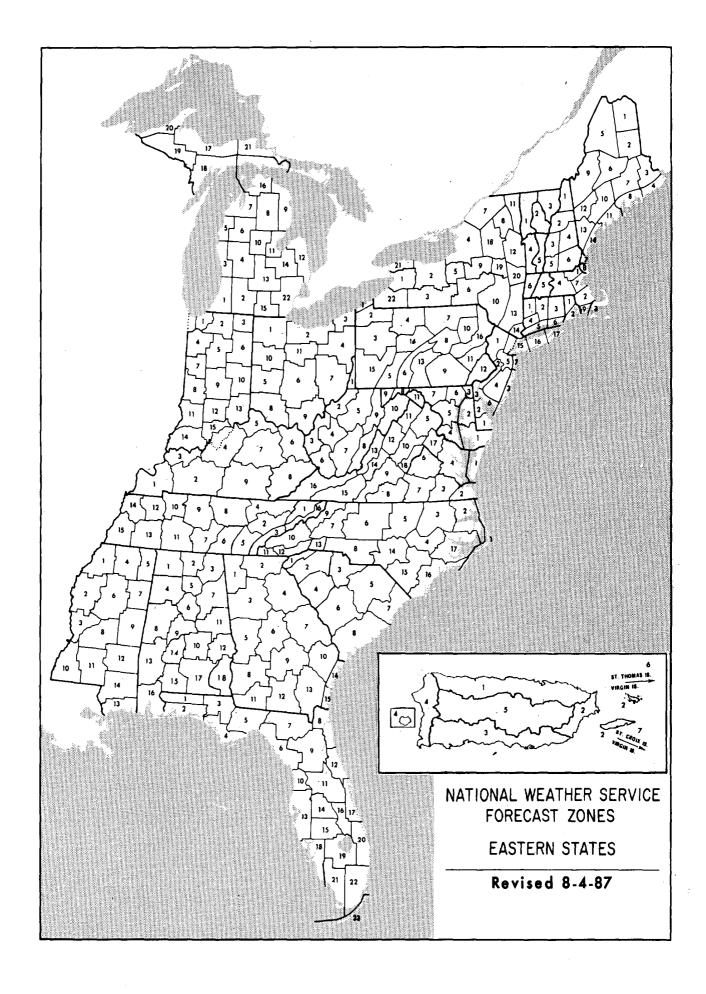




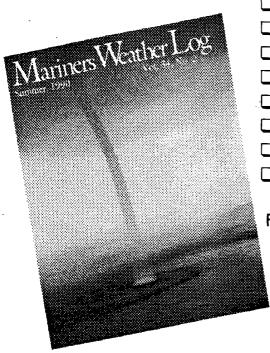








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